SOFTWARE VERSION 1.15

WWW.PRG.COM

BEST BOY 4000® SPOT LUMINAIRE

USER MANUAL

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Best Boy 4000® Spot Luminaire User Manual

Version as of: November 6, 2012

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Best Boy 4000® Spot Luminaire User Manual
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FOREWORD

Compliance Notice

This device complies with Part 15 of the FCC rules. Operation is subject to the following two conditions: 1) This device may not cause harmful interference, and 2) This device must accept any interference received, including interference that may cause undesired operation.

Conforms to:

UL STD 1573

Certified to:

CAN/CSA STD E598-1
CAN/CSA STD E598-2-17

Safety Notice

It is extremely important to read ALL safety information and instructions provided in this manual and any accompanying documentation before installing and operating the products described herein. Heed all cautions and warnings during installation and use of this product.

Safety symbols used throughout this manual are as follows:

CAUTION advising of potential damage to product.

WARNING advising of potential injury or death to persons.

GENERAL INFORMATION PERTAINING TO PROTECTION AGAINST ELECTRICAL SHOCK, FIRE, EXPOSURE TO EXCESSIVE UV RADIATION, AND INJURY TO PERSONS CAN BE FOUND BELOW.

WARNING: INSTRUCTIONS FOR CONTINUED PROTECTION AGAINST FIRE

1) PRG luminaires have been designed for use only with specific lamps. Note lamp type before replacing. Installing another type of lamp may be hazardous.
2) PRG luminaires may be mounted on any type of surface as long as mounting instructions are followed. See instructions detailed in this manual.
3) Replace fuses with same type and rating only.
4) Minimum distance from head to any flammable object is 2m.

WARNING: INSTRUCTIONS FOR CONTINUED PROTECTION AGAINST ELECTRICAL SHOCK

1) PRG luminaires are designed for dry locations only. Exposure to rain or moisture may damage luminaire.
2) Disconnect power before servicing any PRG equipment.
3) Servicing to be performed by qualified personnel only.

WARNING: INSTRUCTIONS FOR CONTINUED PROTECTION AGAINST EXPOSURE TO EXCESSIVE ULTRAVIOLET RADIATION

1) PRG luminaires may use an HID type lamp which produces UV radiation. DO NOT look directly at lamp.
2) It is hazardous to operate luminaires without complete lamp enclosure in place or when lens is damaged. Lenses or UV shields shall be changed if they have become visibly damaged to such an extent that their effectiveness is impaired.

WARNING: INSTRUCTIONS FOR PROTECTION AGAINST INJURY TO PERSONS

1) Exterior surfaces of the luminaire will be hot during operation. Use appropriate safety equipment (gloves, eye protection, etc.) when handling and adjusting hot equipment and components. Service and maintenance should be performed only by qualified personnel as determined by the high pressure lighting fixture manufacturer.
2) Arc lamps generate intense heat. Disconnect power and allow lamp to cool for 5 minutes before relamping.
3) Arc lamps emit ultraviolet radiation which can cause serious skin burn and eye inflammation. Additionally, arc lamps operate under high pressure at very high temperatures. Should the lamp break, there can exist a danger of personal injury and/or fire from broken lamp particles being discharged.
4) The lamp shall be changed if it has become damaged or thermally deformed.
5) If lamp is touched with bare hands, clean lamp with denatured alcohol and wipe with lint-free cloth before installing or powering up the luminaire.
6) Serious injury may result from the generation of ozone by this lamp system. A proper means of venting must be provided.

Notes de sécurité

Avant de procéder à l'installation des produits décrits dans ce guide et de les mettre en marche, il est extrêmement important de lire TOUS les renseignements et TOUTES les directives de sécurité contenues dans ce guide ainsi que toute documentation jointe. Tenir compte de tous les avertissements et suivre toutes les précautions pendant l'installation et l'utilisation de cet appareil.

Les symboles de sécurité utilisés dans ce guide sont les suivants :

ATTENTION Ce symbole annonce que l'appareil risque d'être endommagé.

AVERTISSEMENT Ce symbole annonce qu'il y a risque d'accident grave ou même fatal.

CETTE SECTION CONTIENT DES INFORMATIONS GÉNÉRALES POUR SE PROTÉGER CONTRE LES DÉCHARGES ÉLECTRIQUES, LES INCENDIES, L'EXPOSITION EXCESSIVE AUX RAYONS UV ET TOUT AUTRE ACCIDENT POUVANT ENTRAÎNER DES BLESSURES.

AVERTISSEMENT: RISQUE D' EXPLOSION.

1) Le service et le maintenance ne devront être assurés que par des personnes qualifiées comme precisé par le frabricant des lampes à haute pression.
2) Des vêtement de protection et les procédures précisées dans le manuel du frabricant doit être fournies.

AVERTISSEMENT: RÉGLAGE DES LAMPES

1) Chaleur intense. Débrancher le matériel et laisser refroidir pendant 5 minutes avant de rallumer.
2) Risque l'incendie. N'utilise que des Philips MSR Gold™ FastFit Lamp.

AVERTISSEMENT: DIRECTIVES POUR SE PROTÉGER CONTRE UNE EXPOSITION EXCESSIVE AUX RAYONS UV

1) Risque d'explosion en cas de radiation ultraviolet imprantes.
2) Ne pas intervener en l'absence de confinement de la lampe en place ou quand la lentille est abîmée.

AVERTISSEMENT: DIRECTIVES POUR SE PROTÉGER CONTRE LES ACCIDENTS POUVANT ENTRAÎNER DES BLESSURES

1) Chaleur intense. Eviter tout contact avec des personnes ou des tissues. Attention, de graves blessures peuvent résulter de production d'ozone par cette lampe. Un système de ventilation adapté doit être fournies
2) La température de surface = 300.c
   La temperature de l'ambiance = 50.c
3) Ne convient pas pour un usage résidential.
4) Utilisable seulement dans les locaux secs.

Revision History

This manual has been revised as follows:

Version	Release Date	Notes
BASIC	April 16, 2012	Software version 1.0. Initial release.
A	May 29, 2012	Added Photometric Data to Technical Specifications.
B	November 6, 2102	Updated to software version 1.15. Improved format of DMX Channel Mapping table.

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INTRODUCTION

About This Manual

This manual provides necessary information regarding product safety, installation, and operation for the following equipment:

+ Best Boy 4000® Spot Luminaire

Familiarizing yourself with this information will help you get the most out of your lighting system.

WARNING: It is important to read ALL accompanying safety and installation instructions to avoid damage to the product and potential injury to yourself or others.

Additional Documentation

For more information regarding DMX512 systems, refer to the DMX512/1990 & AMX 192 Standards publication available from United States Institute for Theatre Technology, Inc. (USITT).

USITT
6443 Ridings Road
Syracuse, NY 13206-1111 USA
1-800-93USITT
www.usitt.org

For more information regarding Art-Net protocol, refer to the specification for Art-Net II Ethernet Communication Standard available from Artistic Licence Ltd.

Artistic Licence (UK) Ltd (Registered Office)
24 Forward Drive, Christchurch Avenue,
Harrow, Middlesex, HA3 8NT, United Kingdom
+44 (0)20 88 63 45 15 (phone)
+44 (0)20 84 26 05 51 (fax)
www.artisticlicence.com

For additional documentation, please visit our support tech center at: www.prg.com/support

Customer Service

For technical assistance, contact the PRG International Service Center or contact your nearest PRG office. Contact information for all PRG office locations can be found on our website at: www.prg.com/about-us/locations/

PRG Dallas (International Service)

8617 Ambassador Row, Suite 120
Dallas, Texas 75247 USA
Phone: 214.630.1963
Fax: 214.630.5867
Service Fax: 214.638.2125
Service Email: orders@prg.com

For additional resources and documentation, please visit our website at: www.prg.com

Gobo Art Submission Guidelines

1) Each black and white image should be submitted with artwork oriented as intended for viewing when projected from the luminaire onto a flat surface such as a white wall.
2) Highest resolution and cleanest available image or sketch should be submitted - preferably in vector format (Adobe Illustrator, AutoCad .dxf or .dwg, etc.) or, alternately, a raster image (.tiff, .jpeg, .bmp or .gif) may be used.
3) Areas of the image that are to be left open or clear should be shown in the artwork as white, while areas of the image that are to be occluded or opaque should be shown in the artwork as black.
4) Orient image so that the intended top of the image is pointing straight up.
5) Colored images should be submitted in CMYK color space to accommodate the color separation process.
6) Artwork files should be emailed to: DallasGobo@prg.com

1.

DESCRIPTION

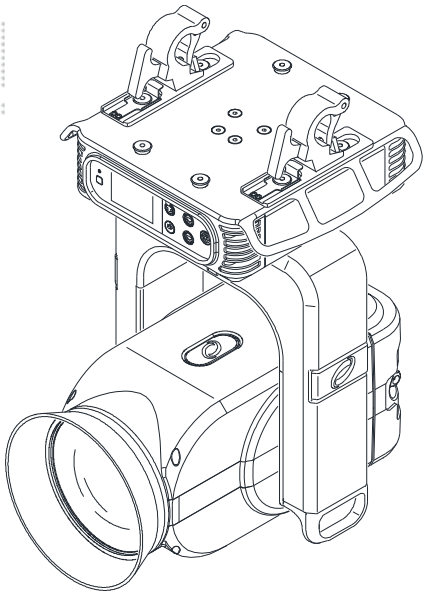
This chapter contains an overview of luminaire features and components.

+ FEATURES

+ COMPONENTS

FEATURES

Overview



The Best Boy 4000 Spot Luminaire is a precision-engineered, automated fixture with optics optimized for 20,000 lumens.

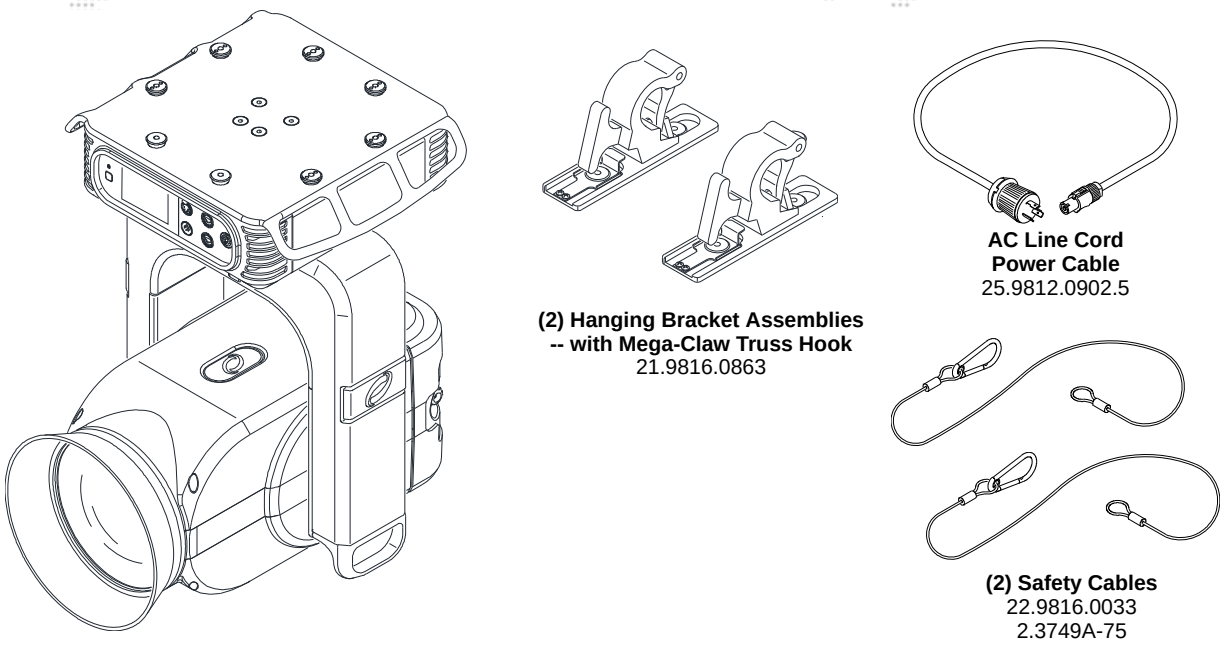
Features

+ SOURCE: MSR 700SA lamp
+ OUTPUT: 20,000 lumens
+ POWER DRAW: Max. 5A at 208V, 10A at 110V. Auto-sensing voltage input range is 90V-264V, 50/60HZ
+ OPTICAL EFFICIENCY: 31%
+ REFLECTOR: Precision glass reflector with cold mirror coating.
+ ZOOM RANGE: 8:1 from a tight spot of 8° to a very wide flood of 64° maintaining focus throughout.
+ BEAM SIZE CONTROL: In addition to the zoom optics, a mechanical iris provides continuous beam size control for both rapid changes and smooth, timed beam angle changes.
+ FRAMING: Four-blade framing system featuring four independent blades mounted in two planes. Each blade can be tilted +/- 30° and the entire frame system can be rotated +/- 60° for a total travel of 120°.
+ DIMMING: Gray-scale glass dimmer for full-field dimming from 0% to 100% with accurate slow-speed control and fast bumps.
+ STROBE: Servo-powered, lightning fast strobe wheel.
+ EFFECTS: One (1) multiplying four-facet prism, two (2) glass effects, and variable frost.
+ COLOR: CMY color system featuring three (3) crossfading color wheels of Cyan, Magenta, and Yellow, plus one (1) designer wheel with seven (7) user-changeable color filters.
+ COLOR TEMPERATURE CONTROL: Adjustable color temperature wheel, range from 3,000K all the way up to 7,500K. Includes an integrated minus green filter.
+ ROTATING GOBOS: Two (2) indexable, rotating gobo wheels with six (6) gobos per wheel. Gobos are individually calibrated so the unit will automatically index the orientation of each gobo regardless of initial placement. Both gobo wheels accept PRG Moiré Gobos™ for advanced gobo rotator effects.
+ OPERATING TEMPERATURE: -20° to 120°F (-29° to 49°C)
+ CONTROL: Compatible with all PRG consoles and a wide variety of DMX512 and Art-Net consoles.
+ DMX CHANNELS: 45 DMX512 channels required per unit.
+ ETHERNET BYPASS: A relay allows Ethernet signals to pass through daisy-chained luminaires even if power is removed.
+ ON-BOARD CONTROL: Built-in LCD touchscreen display allows for on-board fixture control and feedback. On-board battery power allows for the fixture address and configurations to be set without having to apply AC power to the luminaire.
+ PAN & TILT: Three-phase, high-speed servomotors. Brakes are applied when off.
+ RANGE: Pan - 615°, Tilt - 260°
+ POSITIONING: Can be mounted in any orientation.
+ SPACING: Hangs on 33 inch (838 mm) centers when Light Shield is extended. Hangs on 28 inch (711 mm) centers when Light Shield is not extended.
+ WEIGHT: 106 lbs (48.08 kg) without hooks.

COMPONENTS

Included Items

The following illustration shows all items included with the luminaire:



Best Boy 4000 Luminaire
20.9816.0001
2.3749A-

(2) Hanging Bracket Assemblies
-- with Mega-Claw Truss Hook
21.9816.0863

AC Line Cord
Power Cable
25.9812.0902.5

(2) Safety Cables
22.9816.0033
2.3749A-75

Figure 1-1: Best Boy 4000 Luminaire Included Items

Replacement Items and Accessories

The following items can be ordered from PRG.

PRG P/N	TEAM Ecode	Accessory
21.9816.0863	-	Hanging Bracket Assembly
22.9816.0033	2.3749A-75	Heavy Duty Safety Cable
23.9623.0177	-	DMX Termination Connector
25.9812.0902.5	-	AC Line Cord 2.5' 14/3 L6-20 Cable Assembly
71.2528.0700	2.3749A-02	Philips MSR 700SA 700W Short Arc Lamp

Major Components and Controls

The following illustration shows the external luminaire components and controls.

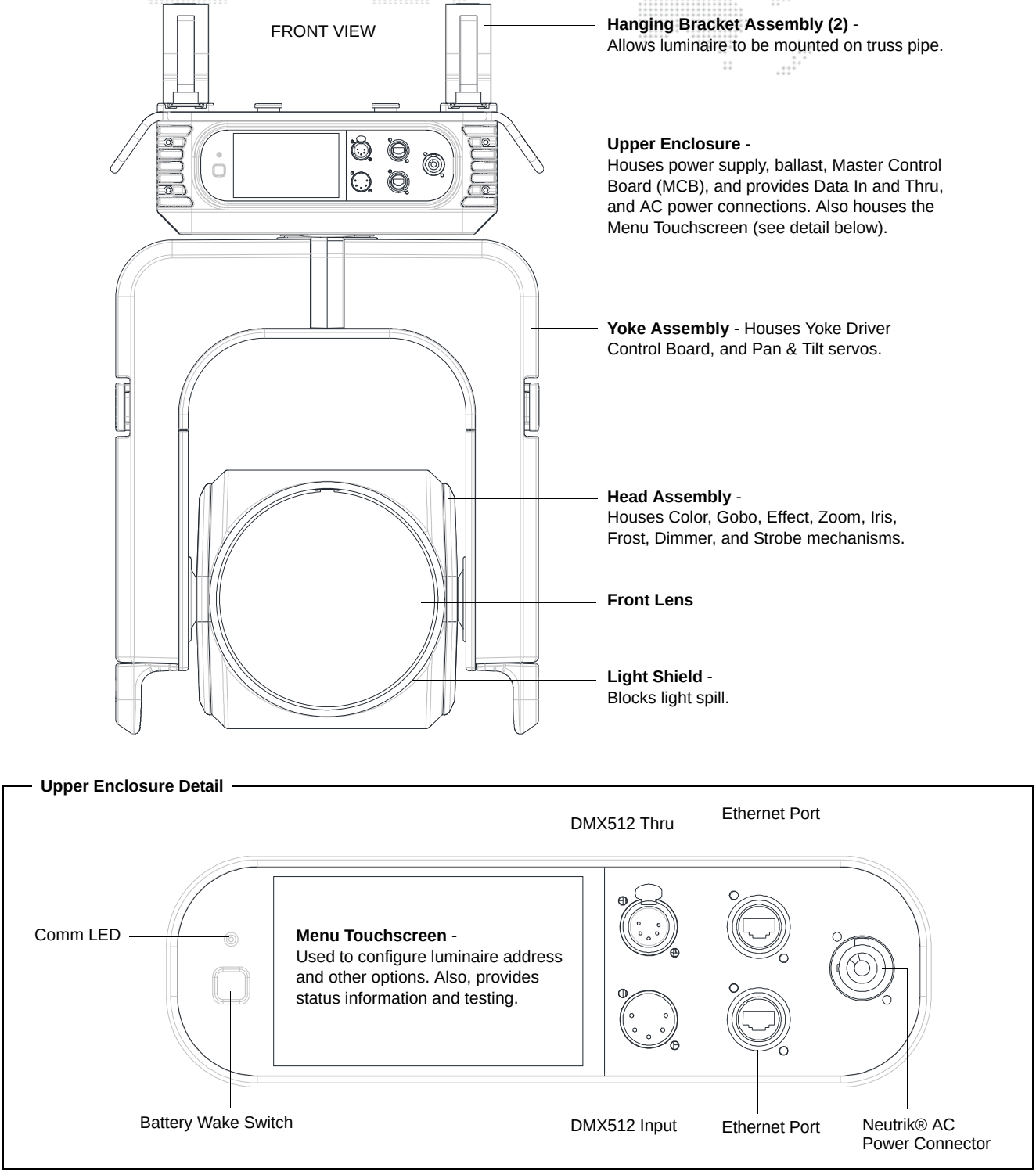

FRONT VIEW
Hanging Bracket Assembly (2) - Allows luminaire to be mounted on truss pipe.
Upper Enclosure - Houses power supply, ballast, Master Control Board (MCB), and provides Data In and Thru, and AC power connections. Also houses the Menu Touchscreen (see detail below).
Yoke Assembly - Houses Yoke Driver Control Board, and Pan & Tilt servos.
Head Assembly - Houses Color, Gobo, Effect, Zoom, Iris, Frost, Dimmer, and Strobe mechanisms.
Front Lens
Light Shield - Blocks light spill.
Upper Enclosure Detail
DMX512 Thru
Ethernet Port
Comm LED
Menu Touchscreen - Used to configure luminaire address and other options. Also, provides status information and testing.
Battery Wake Switch
DMX512 Input
Ethernet Port
Neutrik® AC Power Connector

Figure 1-2: Best Boy 4000 Luminaire External Components and Controls

Designer Color Wheel Standard Configuration

The following drawing shows the standard Designer Color Wheel configuration.

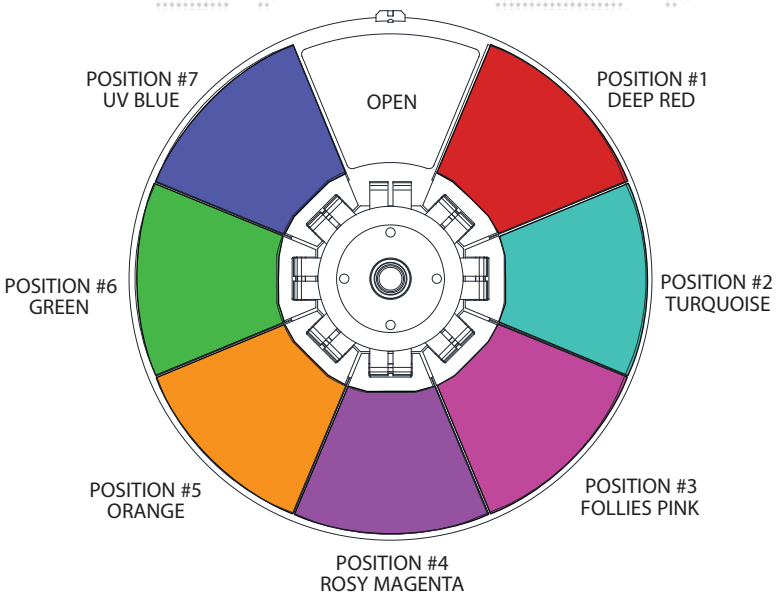


Figure 1-3: Designer Color Wheel Standard Configuration

Effect Wheel Standard Configuration

The following drawing shows the standard Effect Wheel configuration.

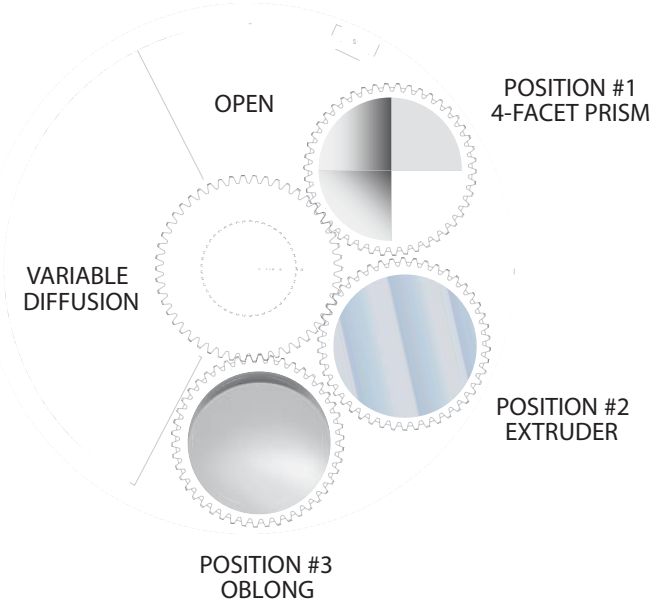


Figure 1-4: Effect Wheel Standard Configuration

Gobo Wheel Standard Configurations

The following drawings show the standard Gobo Wheel configurations.

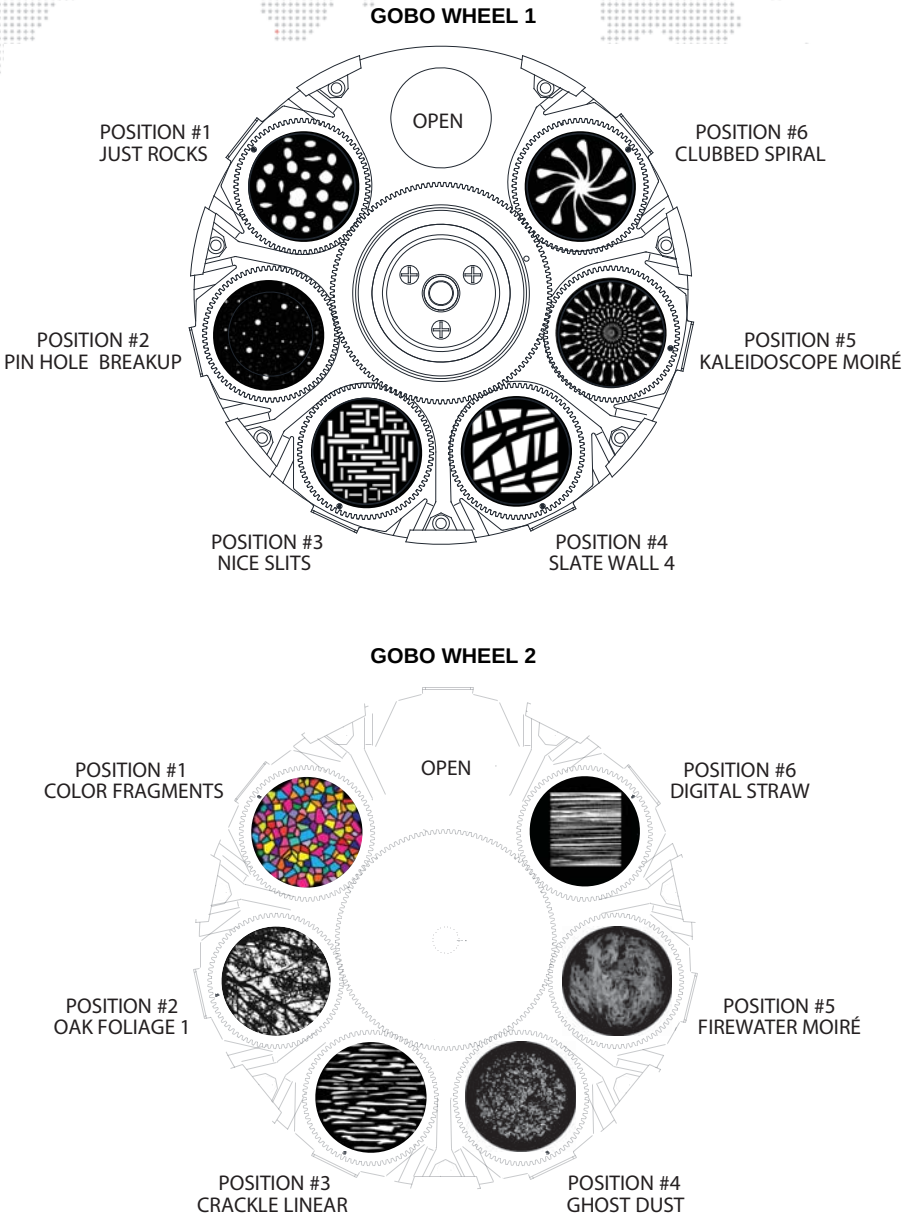


Figure 1-5: Gobo Wheel Standard Configurations

About Moiré Gobos

Moiré gobos contain two pieces of glass: one that is fixed and another that rotates. Since the two pieces of glass are very close together, it creates an interesting interference effect (which is referred to as the "moiré"). Due to this construction they do not contain sensors, and therefore cannot be calibrated to a certain orientation at startup as with standard gobos.

CAUTION: Moiré gobo positions MUST be set using the menu system.

2.

INSTALLATION

This chapter contains instructions for installing the luminaire. It includes instructions for connecting power and data, along with instructions for powering up the luminaire for the first time and addressing it within your system.

+ POWER AND DATA CABLING REQUIREMENTS
+ INSTALLATION PROCEDURES
+ POWER UP AND BASIC SETUP PROCEDURES

POWER AND DATA CABLING REQUIREMENTS

Power

The Best Boy 4000 Spot Luminaire requires standard AC power distribution from 100-240 VAC, 50/60 Hz, 12A maximum. The upper enclosure provides a Neutrik® PowerCon connector for power input. Use the provided AC Line Cord Cable Assembly (25.9812.0902.5) to connect power.

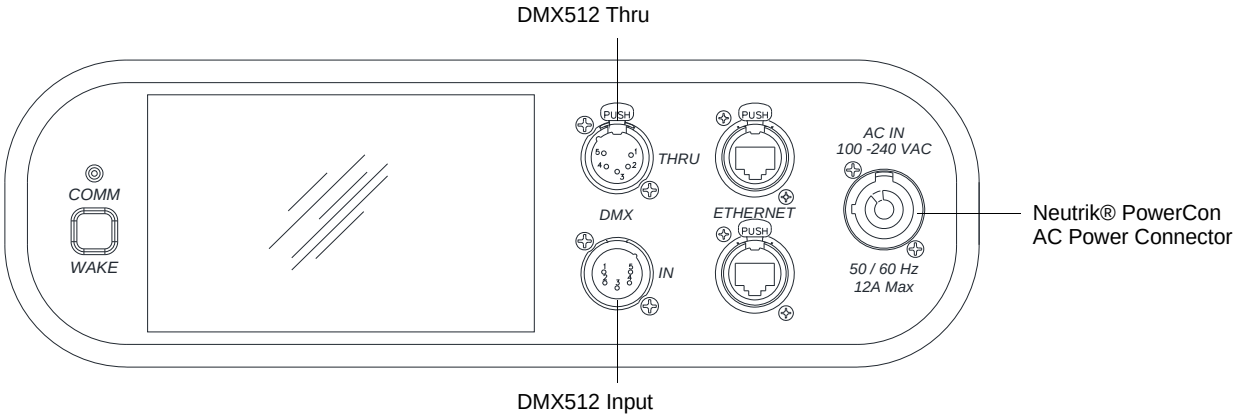


Figure 2-1: Power Input and DMX512 Connections

Data

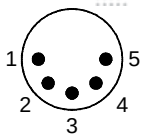
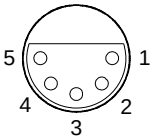
DMX512 Cables

The Best Boy 4000 Luminaire is equipped with two, 5-pin XLR connectors for DMX IN and DMX THRU (out) applications. DMX IN requires a 5-pin, female XLR connector and DMX THRU requires a 5-pin, male XLR connector. When purchasing or constructing data cables, it is important that not only the correct cable type be used, but also quality cable to ensure a reliable DMX512 system. Your cabling should meet the following USITT DMX specification requirements:

+ Suitable for use with EIA485 (RS485) operation at 250k baud.
+ Characteristic impedance 85-150 ohms, nominally 120 ohms.
+ Low capacitance.
+ Two twisted pairs.
+ Foil and braid shielded.
+ 24 AWG minimum gauge for runs up to 1000 feet (300m).
+ 22 AWG minimum gauge for runs up to 1640 feet (500m).

Note: Microphone type cables and other general purpose, two-core audio or signal cables are not suitable for use with DMX512.

The XLR 5-pin connectors should be wired as follows:

Pin/Wire Code to XLR Connectors						
DMX Thru Cable Pinout  Male Conn	**Pin 1** Foil & Braided Shield	**Pin 2** 1st conductor of 1st twisted pair Data (-)	**Pin 3** 2nd conductor of 1st twisted pair Data (+)	**Pin 4** 1st conductor of 2nd twisted pair Data (-)	**Pin 5** 2nd conductor of 2nd twisted pair Data (+)	DMX In Cable Pinout  Female Conn

Note: Refer to the USITT Recommended Practice for DMX512 guide for additional information regarding DMX512 systems. See "Additional Documentation" on page 1.

Recommended Cable Types/Manufacturers

These are only a few of the suitable cable types. Any quality EIA485, twisted pair, 120 ohm, shielded cable will also work.

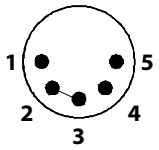
Type	Pairs	ZΩ*	Jacket	AWG	Use	Temp (F)
Belden Cables						
1215A	2	150	PVC	26	IBM Type 6 Office cable	75
1269A	2	100	PTFE	22 (Solid)	High Temp, Plenum cable	200
8102	2	100	PVC	24	UL2919	80
8132	2	120	PVC	28	UL2919	80
8162	2	100	PVC	24	UL2493	60
82729	2	100	PTFE	24	High Temp, Plenum cable	200
88102	2	100	PTFE	24	High Temp, Plenum cable	200
89696	2	100	PTFE	22	High Temp, Plenum cable	200
89729	2	100	PTFE	24	High Temp, Plenum cable	200
89855	2	100	PTFE	22	High Temp, Plenum cable	200
9729	2	100	PVC	24	UL2493	60
9804	2	100	PVC	28	UL2960	60
9829	2	100	PVC	24	UL2919	80
9842	2	120	PVC	24	UL2919	80
Proplex Cables						
PC224P	2	110	Polyurethane	22	Heavy Duty and Portable	105
PC224T	2	110	PVC	22	UL2464	105
PC226T	3	110	PVC	22	UL2464	

* Characteristic Impedance

DMX512 Male Termination Connector

A male XLR DMX512 termination connector is required at the last luminaire (or "far end of the line") to prevent signal reflections. Signal reflections may cancel out the signal at certain line lengths, resulting in errors. The terminator is also necessary for software downloads and running tests on multiple luminaires. To construct your own connector, you will need the following components:

+ 5-pin, male XLR connector.
+ 120 ohm resistor.



Solder resistor across pins 2 & 3

Note: A male termination connector is also available as an accessory from PRG. See "Replacement Items and Accessories" on page 5.

Ethernet Cables

The Best Boy 4000 Luminaire is equipped with two RJ-45 type connectors for Ethernet input/output. Ethernet cabling should follow these guidelines:

+ Ethernet cable assemblies must match the CAT5e specification.
+ Regular or crossover cables are acceptable.
+ Both EtherCon® and RJ-45 connectors are acceptable.

Ethernet Bypass

A relay allows Ethernet signals to pass through daisy-chained luminaires even if power is removed.

INSTALLATION PROCEDURES

Unpacking and Attaching Hanging Brackets

The Best Boy 4000 Spot Luminaire can be hung horizontally or vertically from any structure designed to accommodate the load of this moving luminaire. Two provided Hanging Bracket Assemblies (21.9816.0863) are used to attach the luminaire to a truss pipe. The Hanging Brackets consist of a pre-assembled bracket with a Mega-Claw Truss Hook.

To unpack and attach brackets:

Step 1. Unlatch case lid and tilt upward as shown in **Figure 2-2**.

Step 2. Remove Power Cord, Safety Cables, and Hanging Brackets from case.

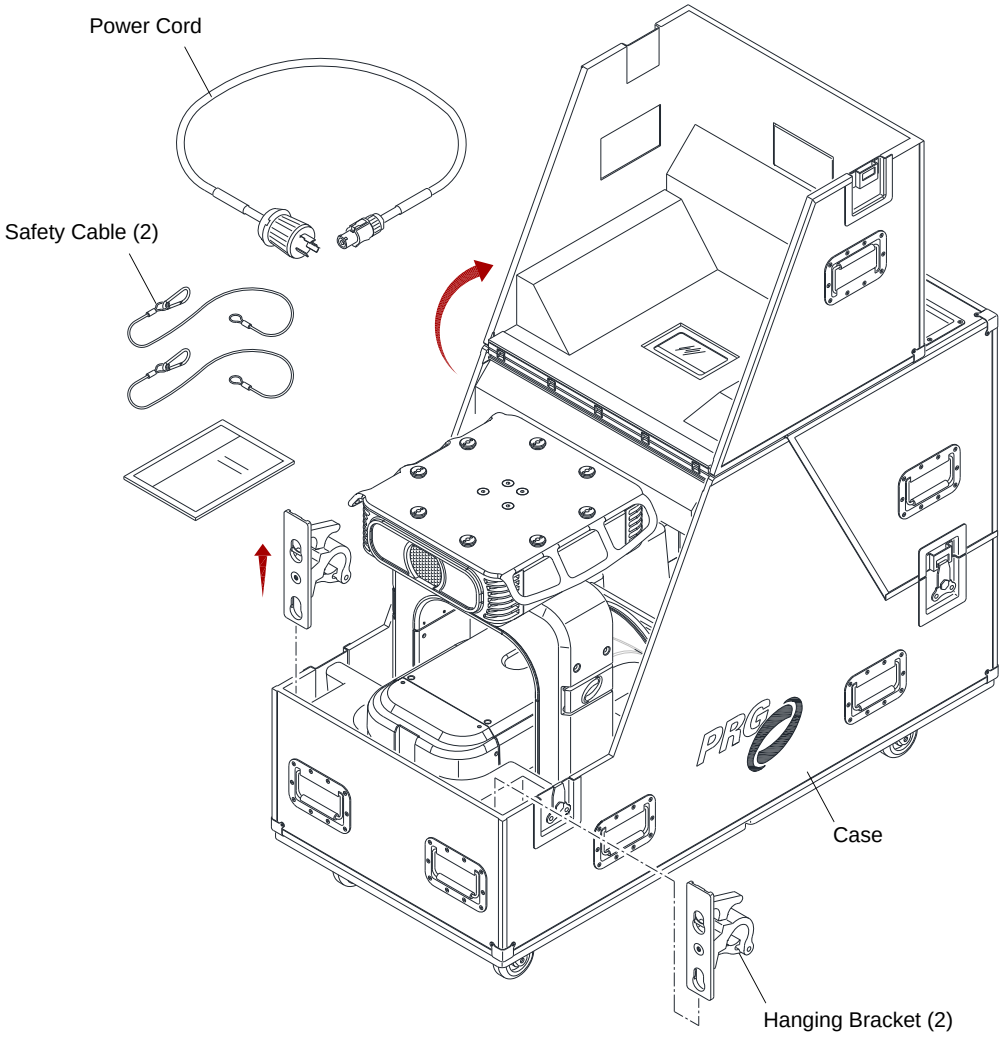


Figure 2-2: Unpacking Road Case

Step 3. Install Hanging Brackets as follows:

a. Choose orientation. Brackets may be attached in one of four positions as shown in **Figure 2-3**.

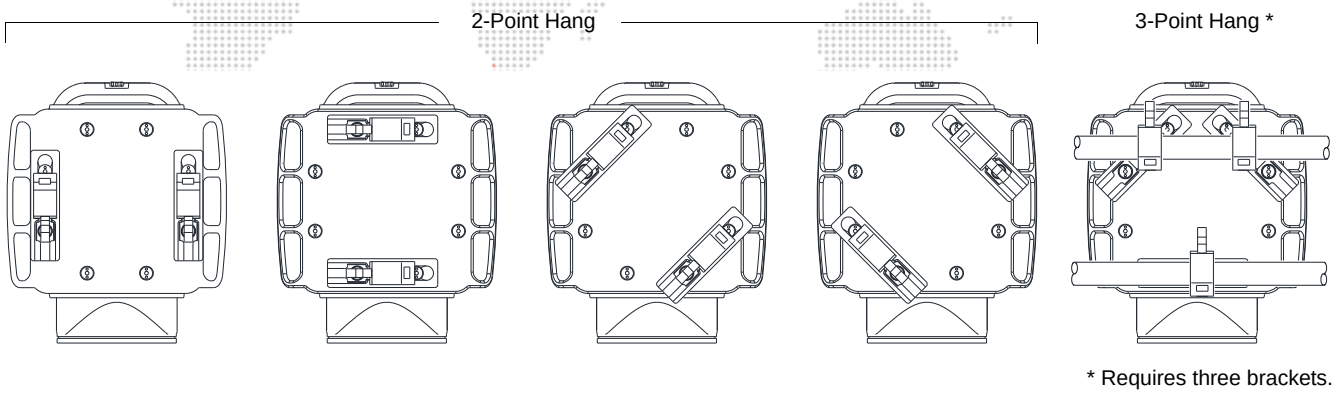


Figure 2-3: Hanging Bracket Orientations

b. Orient Hanging Bracket in desired direction over two attachment buttons on bottom of upper enclosure (**Figure 2-4**).

c. Place Hanging Bracket down over buttons and slide until bracket locks into place (you will hear a "click" when bracket is locked).

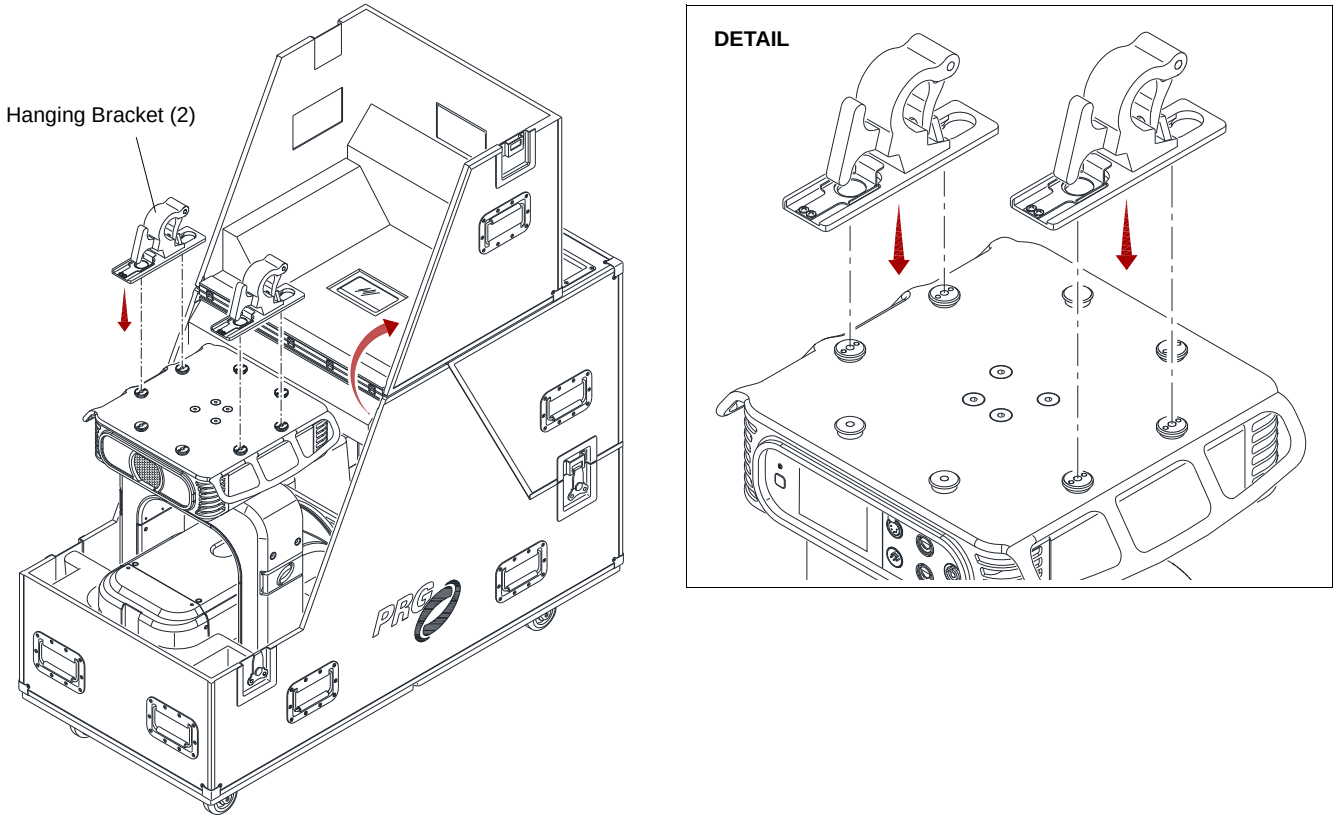


Figure 2-4: Attaching Hanging Brackets

Standard Hang

WARNING: The luminaire is heavy. Use caution when lifting.

WARNING: Two safety cables and at least two truss hooks should be used in all hang configurations.

To install in standard 2-point hang:

Step 1. Unpack case and attach Hanging Brackets. Refer to "Unpacking and Attaching Hanging Brackets" on page 13.

Step 2. Roll case to mounting location as required (**Figure 2-5**).

Step 3. Using two people, carefully lift luminaire into mounting position on truss pipe.

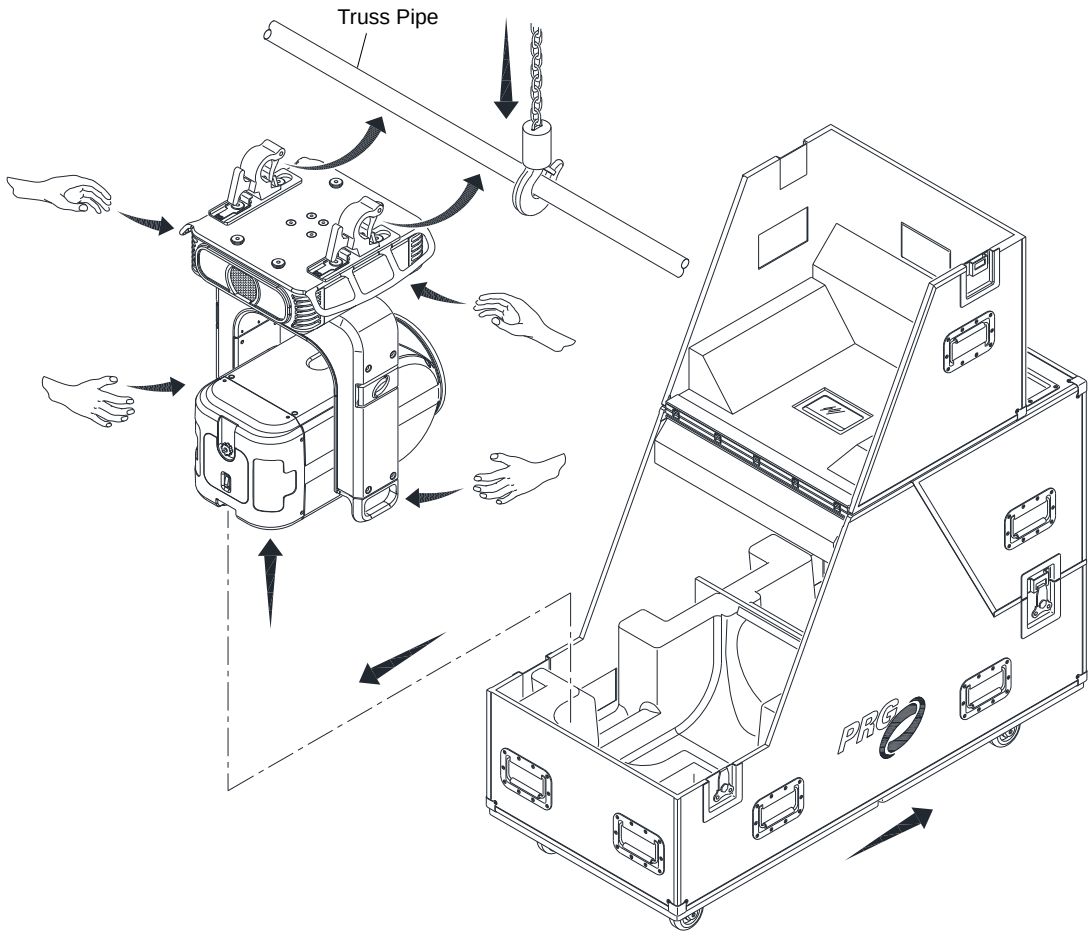
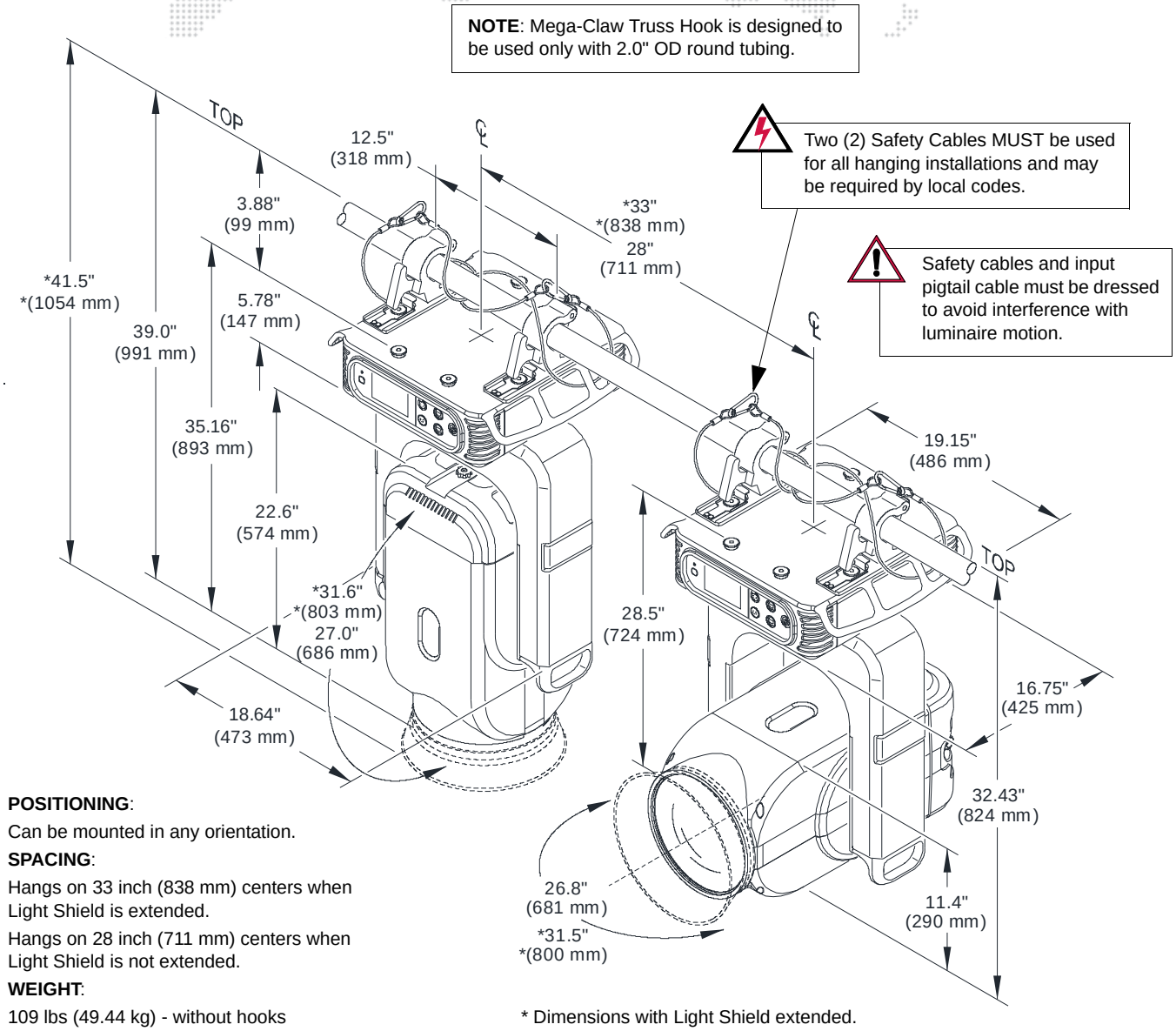


Figure 2-5: Removing Luminaire From Case

Step 4. Secure in place by tightening Truss Hook wing bolts (**Figure 2-6**). Ensure that luminaire is fully supported.

Step 5. Feed safety cables through base and secure around pipe as shown in **Figure 2-6**.

Step 6. Connect power and data cables according to "Connecting Power and Data" on page 21.


NOTE: Mega-Claw Truss Hook is designed to be used only with 2.0" OD round tubing.
Two (2) Safety Cables MUST be used for all hanging installations and may be required by local codes.
Safety cables and input pigtail cable must be dressed to avoid interference with luminaire motion.
TOP
12.5" (318 mm)
3.88" (99 mm)
*33" *(838 mm)
28" (711 mm)
*41.5" *(1054 mm)
5.78" (147 mm)
39.0" (991 mm)
35.16" (893 mm)
22.6" (574 mm)
*31.6" *(803 mm)
27.0" (686 mm)
18.64" (473 mm)
19.15" (486 mm)
28.5" (724 mm)
16.75" (425 mm)
32.43" (824 mm)
26.8" (681 mm)
*31.5" *(800 mm)
11.4" (290 mm)

POSITIONING:

Can be mounted in any orientation.

SPACING:

Hangs on 33 inch (838 mm) centers when Light Shield is extended.

Hangs on 28 inch (711 mm) centers when Light Shield is not extended.

WEIGHT:

109 lbs (49.44 kg) - without hooks

* Dimensions with Light Shield extended.

Figure 2-6: Standard Hanging Configuration and Dimensions

Vertical "Yoke Out" Hang

The Best Boy 4000 Spot Luminaire can be hung in a vertical position, if required. In this configuration, the luminaire should be positioned so that the interface panel (display) is facing to the side for ease of programming.

WARNING: The luminaire is heavy. Use caution when lifting.

WARNING: The vertical configuration requires **3 people** to hang and secure the luminaire.

WARNING: Two safety cables and at least two truss hooks must be used in all hang configurations.

To install in vertical hang:

Step 1. Orient Hanging Brackets as shown in **Figure 2-7**.

Step 2. Place Hanging Bracket down over buttons and slide until bracket locks into place (you will hear a "click" when bracket is locked).

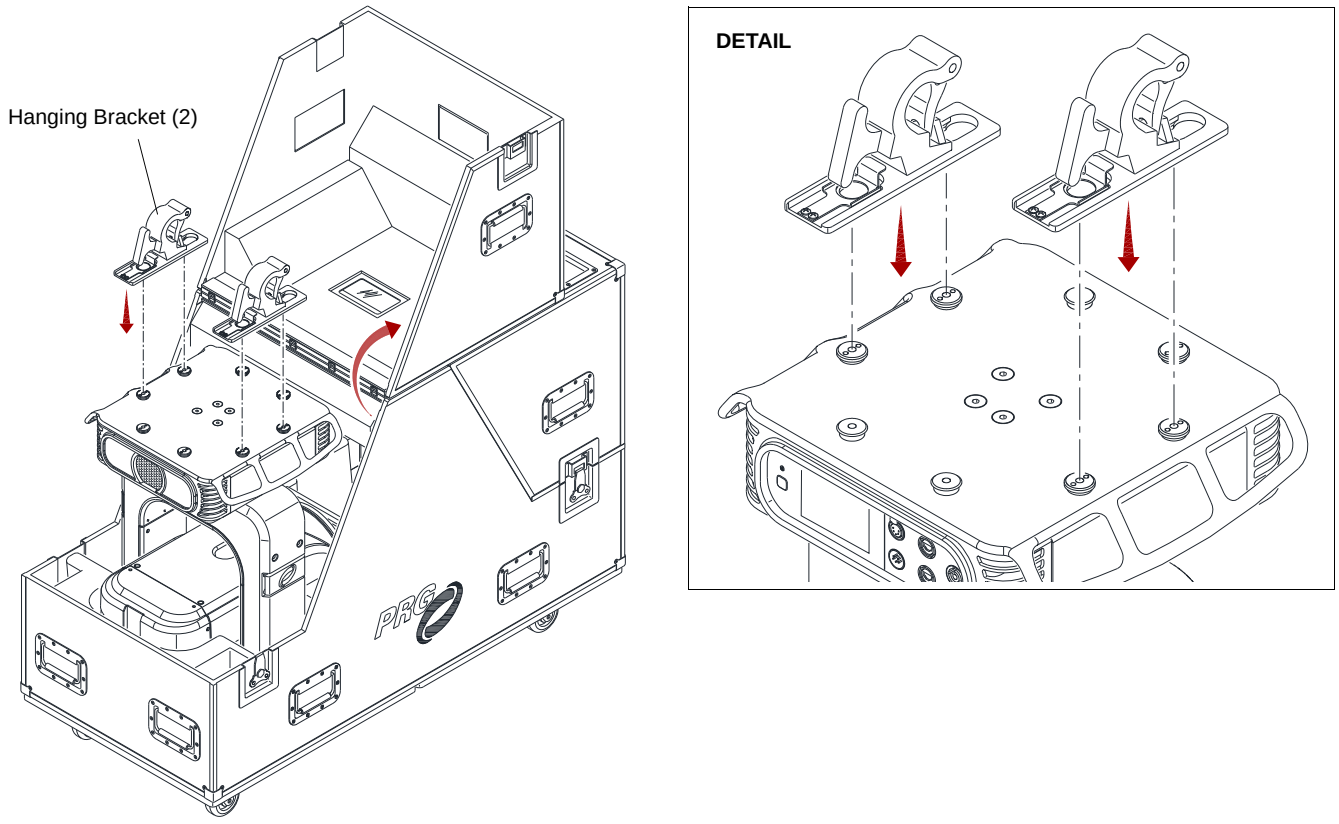


Figure 2-7: Attaching Hanging Brackets

Step 3. Roll case to mounting location as required (**Figure 2-8**).

Step 4. Using two people, carefully lift luminaire into mounting position so that *display is facing to the side*.

Step 5. Using a third person, secure in place by tightening Truss Hook wing bolts. Ensure that luminaire is fully supported.

Step 6. Feed safety cables through mounting bracket slots and secure around pipe.

Step 7. Connect power and data cables according to "Connecting Power and Data" on page 21.

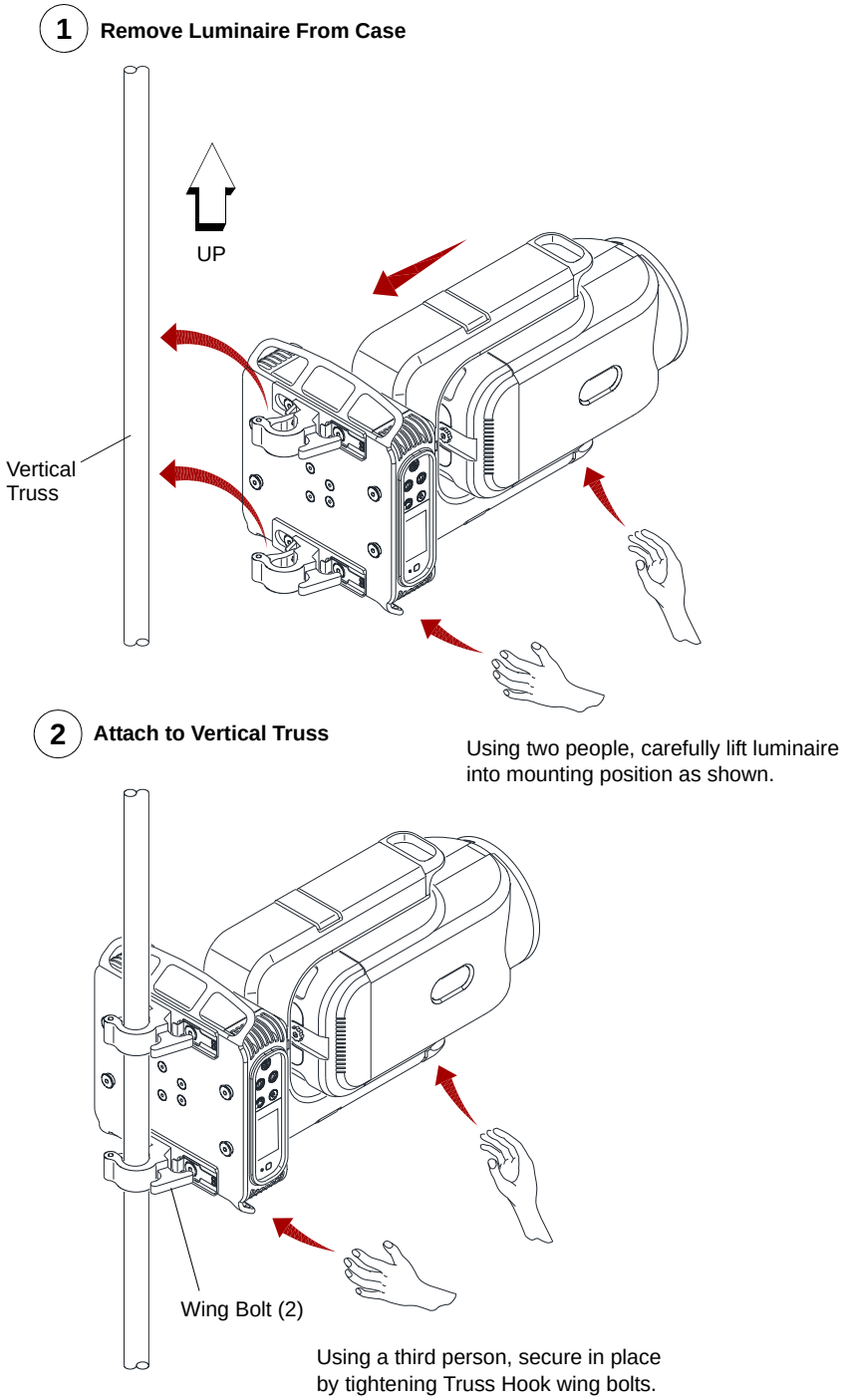

1
Remove Luminaire From Case
UP
Vertical
Truss
2
Attach to Vertical Truss
Using two people, carefully lift luminaire into mounting position as shown.
Wing Bolt (2)
Using a third person, secure in place by tightening Truss Hook wing bolts.

Figure 2-8: Vertical "Yoke Out" Hanging Configuration

Standing Position

The Best Boy 4000 Spot Luminaire can also be used in a standing position. Be sure that the floor or stage will accommodate the load of this moving luminaire.

To install in a standing position:

Step 1. Unpack case as shown in **Figure 2-2** on page 13, but do not remove hanging brackets. (These are not used for standing installations.)

Step 2. Carefully remove luminaire from case and place in standing position.

Step 3. Connect power and data cables according to "Connecting Power and Data" on page 21.

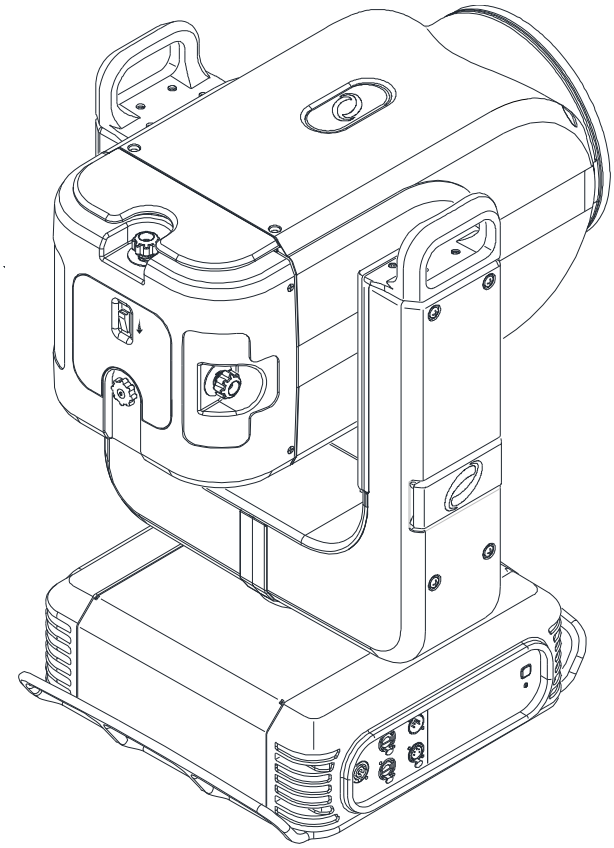


Figure 2-9: Standing Position

Light Shield

The Light Shield can be used to block light spill which may occur at some zoom angles.

To use the Light Shield, fold outward as shown below. If the Light Shield is not necessary, it can be folded backward.

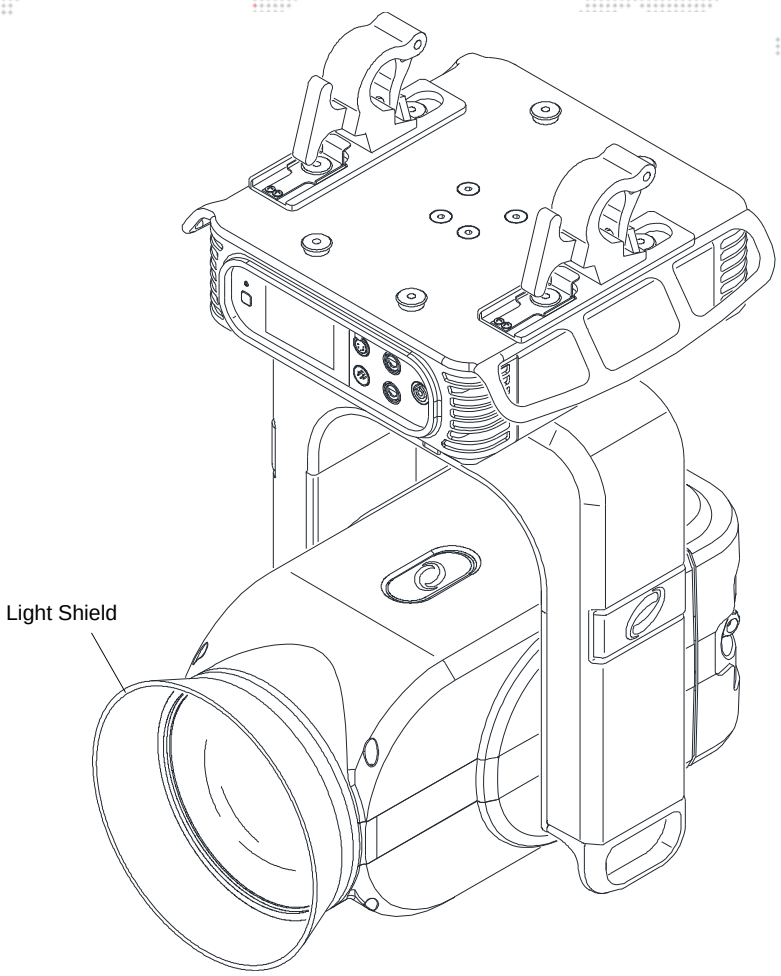


Figure 2-10: Light Shield in Blocking Position

Note: When the Light Shield is extended, the luminaire spacing must be adjusted. Refer to **Figure 2-6** on page 16.

Connecting Power and Data

The Best Boy 4000 Spot Luminaire may be controlled by DMX512 or Ethernet. The control inputs are located at the upper enclosure connector panel.

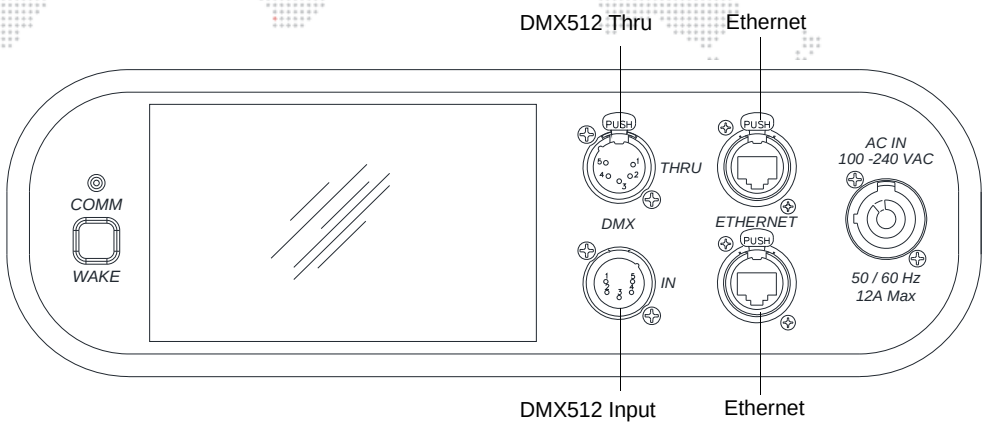


Figure 2-11: Data Connections

Observe the following guidelines when setting up the system:

+ A maximum of **32** luminaires may be connected in any one DMX512 or Ethernet data link. However, note that the maximum limit applies to the luminaire "daisy-chain" only. Your system or console may require fewer luminaires on a single data link path. Consult your console documentation for more information.
+ The Ethernet ports are not assigned as either In or Thru as the DMX512 ports are assigned. Ethernet can be connected in any configuration.
+ Standard "star" topology should be used with Ethernet configurations. DO NOT create a "ring" with Ethernet.
+ The ports may not be used as converters (i.e., you cannot input Art-Net and get DMX512 out on an XLR, or vice versa).
+ A relay allows Ethernet signals to pass through daisy-chained luminaires even if power is removed.

Power is provided by the AC Line Cord Cable Assembly (25.9812.0902.5) connected to the Neutrik® power input connector. There is no power on/off switch. Turn off the circuit breaker at the power distribution rack *before* connection or disconnecting the Neutrik PowerCon.

Note: Refer to "Comm LED Operation" on page 24 for more details about the Comm LED.

To connect power and data:

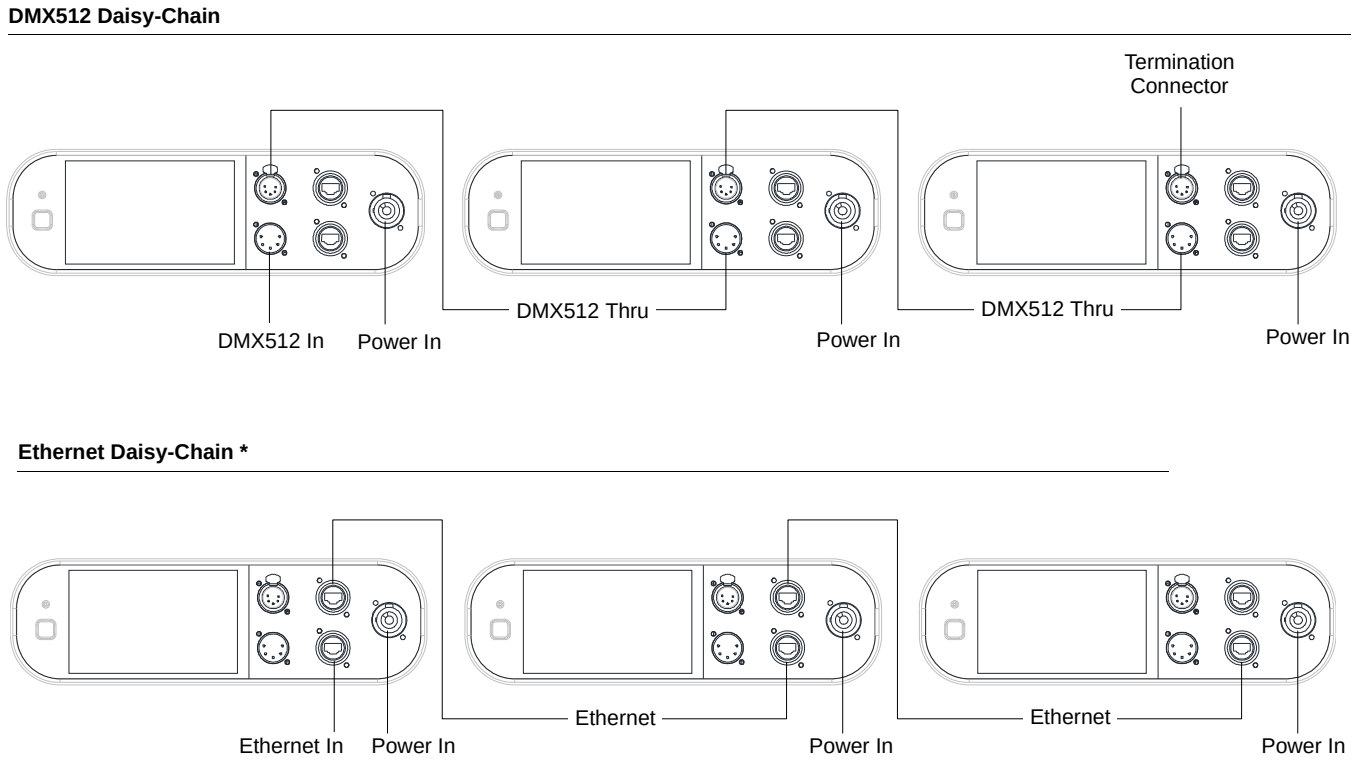
Step 1. Connect data cable (DMX512 or Ethernet) from console to appropriate input connector at first luminaire in chain (**Figure 2-12**).

Step 2. If required, connect additional data cables from appropriate thru connectors to input connectors of remaining luminaires in chain.

Step 3. *For DMX512 systems*: At last luminaire in chain, install male termination connector at DMX512 THRU connector. (Luminaires and other devices on the same DMX512 chain may not function properly without termination.) Refer to "DMX512 Male Termination Connector" on page 12.

Step 4. At each luminaire, connect AC Line Cord Cable Assembly from power input source.

Step 5. Dress and secure all cables so that they will not interfere with luminaire head or yoke movement.



*The Ethernet ports are not assigned as either In or Thru as the DMX512 ports are. Ethernet can be connected in any configuration.

Figure 2-12: Connecting Power and Data Cables

Note: If control data is active on both XLR and Ethernet connections, the fixture will follow the DMX512 commands coming from the XLR.

POWER UP AND BASIC SETUP PROCEDURES

Powering Up the Luminaire

When AC power is applied, the luminaire will begin a calibration sequence which moves its pan, tilt, and all beam control mechanisms. After calibration, the luminaire head will either stop at its "home" position (which positions the pan axis at mid-rotation and the head parallel to the yoke with the lens pointing away from the luminaire upper enclosure) or move to its current DMX-defined position if DMX512 data is present. The beam control mechanisms will also move to their "home" or DMX-defined positions. The lamp is set to OFF in the default mode.

The luminaire also contains an on-board battery so that it can be addressed and configured without being connected to main power (refer to "Wake Switch" on page 30).

CAUTION: Before applying power, be sure the luminaire is hung or positioned so that the head and yoke can move freely without restriction. Refer clearances in **Figure 2-6** on page 16.

To power up:

Step 1. At each luminaire, connect power. Allow luminaire to complete its calibration sequence.

Step 2. For normal power up, the Menu Touchscreen "Home" screen will display **Status OK**. The Home screen will also display the luminaire's DMX address and lamp information.

Step 3. Check Comm LED for proper operation. Refer to "Comm LED Operation" on page 24.

Step 4. To strike lamp, send appropriate command from console or follow steps provided in "Starting the Lamp" on page 27.

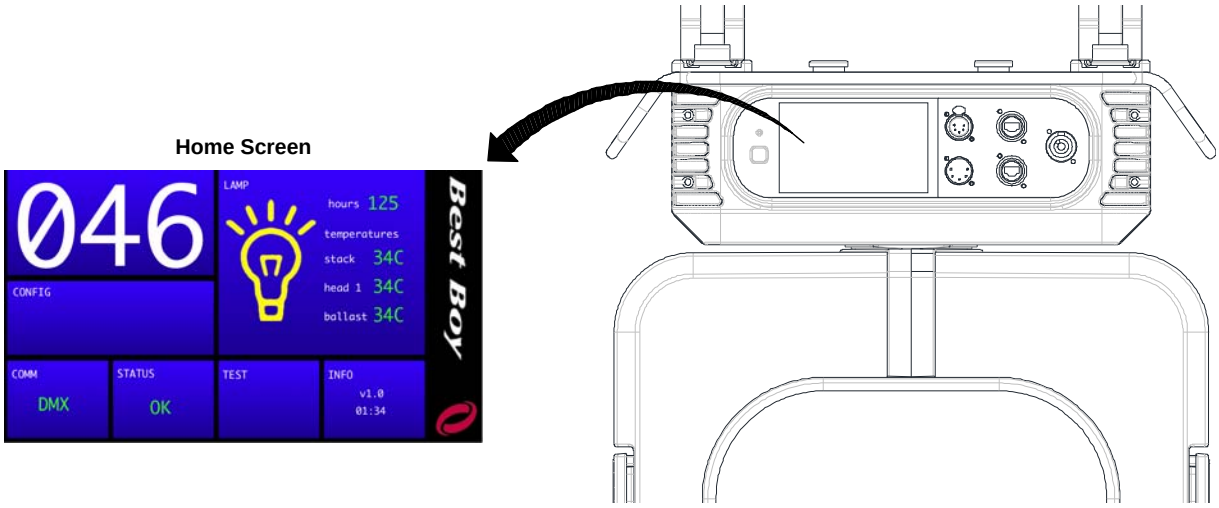


Figure 2-13: Menu Touchscreen at Power Up

Note: Refer to "Menu System" on page 30 for more information about the Menu Touchscreen.

Comm LED Operation

The Comm LED - located on the upper enclosure connector panel - indicates system control status. This can be used determine if the luminaire is receiving a control signal. LED indications are as follows:

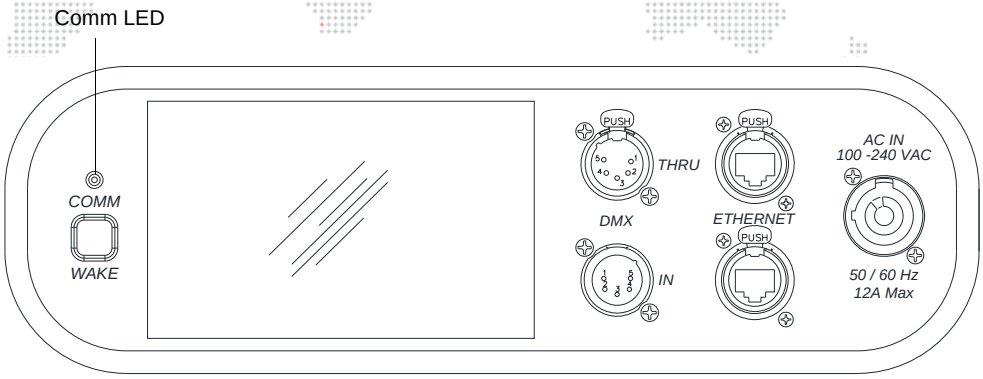


Figure 2-14: Comm LED

- **Green** - The Comm LED will light *green* if either DMX or Ethernet control is present. Note that if both valid DMX and Ethernet control are being received, DMX control will take precedence.
- Yellow - The Comm LED will blink *yellow* if there is an error.
- **Red** - The Comm LED will light *red* if no DMX or Ethernet is present.

Bypassing Calibration

If the menu screen is touched (in the center) and held during startup, the luminaire will present a menu that provides the option to bypass calibration. This feature allows the luminaire to skip the calibration sequence so that it can be powered up in the case for configuration purposes.

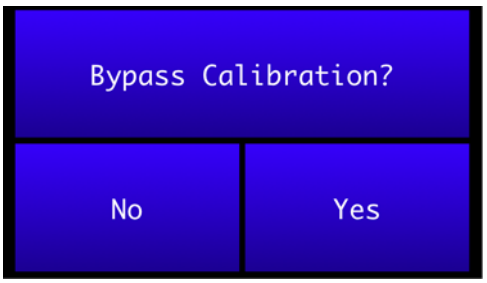
To bypass calibration:

Step 1. Connect power to luminaire.

Step 2. At startup, touch center of menu screen and hold until Bypass Calibration menu appears.

Step 3. Press Yes to bypass calibration. (The menu will automatically dismiss if no selection is made within 5 seconds.)

Step 4. Proceed with programming of starting address or other options.



Setting a Starting Address

The method for setting a DMX starting address is the same whether the luminaire is being controlled by DMX512 or Ethernet (Art-Net). The only difference is that the Home screen will display the Comm as either "DMX" or "ETH" depending on the control input.

The DMX starting address is programmed at the Menu Touchscreen. *The luminaire retains its address even if power is removed.*

Note: Refer to your console operating instructions for specific information regarding its addressing requirements.

DMX Comm

The starting address for DMX512 systems can be set from the HOME screen.

To program a starting address:

Step 1. At Home screen, press address number panel.

Step 2. At numeric keypad, enter new starting address and press ENTER.

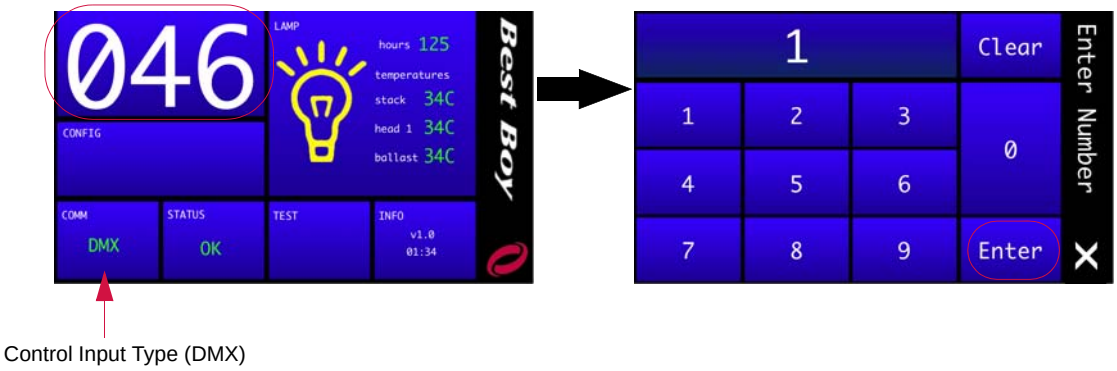


Figure 2-15: Setting Starting Address (DMX Control)

Note: Refer to "Menu System" on page 30 for more information about the Menu Touchscreen.

Ethernet (Art-Net) Comm

The starting address for Ethernet (Art-Net) systems can be set from the HOME screen.

To program a starting address:

Step 1. At Home screen, press address number panel.

Step 2. At numeric keypad, enter new starting address and press ENTER.

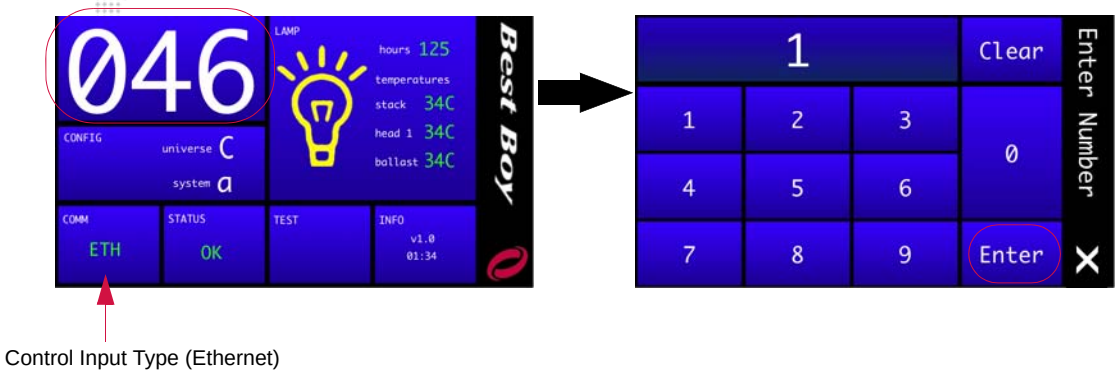


Figure 2-16: Setting Starting Address (Ethernet Control)

To select an Art-Net universe:

If using Ethernet control, a universe must be selected in addition to the DMX address. The universe can be selected and displayed in either alphabetic or numeric mode (using the UNIV FORMAT screen). The alpha mode is useful to differentiate universes from DMX addresses and is the standard on PRG console systems. In alpha mode, the valid universes are A-IV, selected from the alphabetic keypad (as shown below). If in numeric mode, the valid universes are 0-255, selected from the numeric keypad.

To set the Universe and Universe Format, press the CONFIG panel at the Home screen:

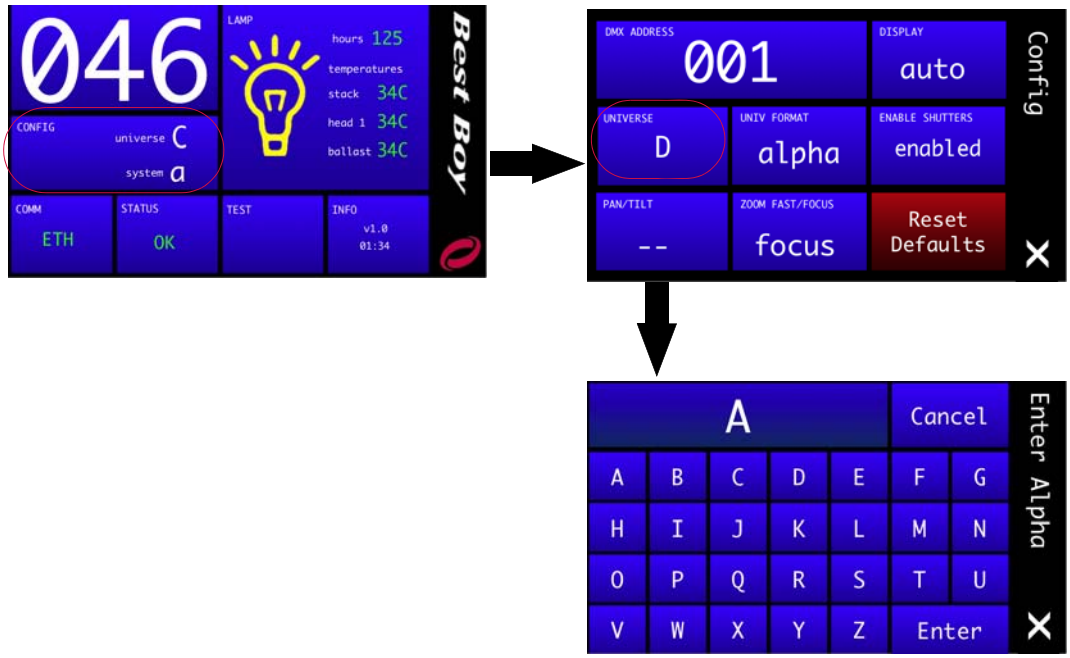


Figure 2-17: Selecting a Universe (Ethernet Control)

Note: Refer to "Menu System" on page 30 for more information about the Menu Touchscreen.

Starting the Lamp

The lamp can be started (turned on) via console command or at the luminaire itself using the Menu Touchscreen.

To start lamp using Menu Touchscreen:

Step 1. At Home screen, press LAMP panel.

Step 2. At Lamp screen, current lamp status (ON/OFF) will be displayed. Press START to bring up YES/NO options.

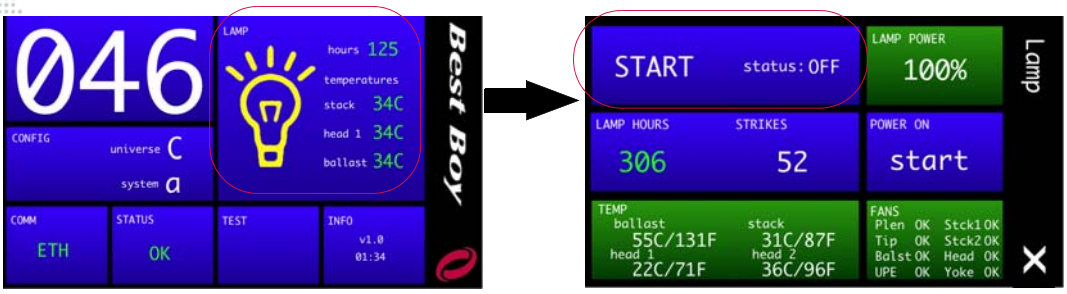


Figure 2-18: Starting the Lamp

Step 3. Press YES to start lamp.

Step 4. Exit Lamp screen by pressing (X).

Lamp Power Up Setting

The luminaire can be configured to power up with its lamp on or off via the Lamp screen. For details about all lamp configuration options, refer to "Lamp Screen" on page 33.

Configuring Comm Loss Setting

The Communication screen includes a "Comm Loss" setting. This setting will configure how long to wait before the fixture fades to black upon loss of comm data.

To configure the Comm Loss setting:

Step 1. At Home screen, press COMM panel.

Step 2. At Communication screen, press COMM LOSS panel.

Step 3. Set Trigger Fade After to No Fade, 30 Seconds or 60 Seconds.

Step 4. Exit Communication screen by pressing (X).

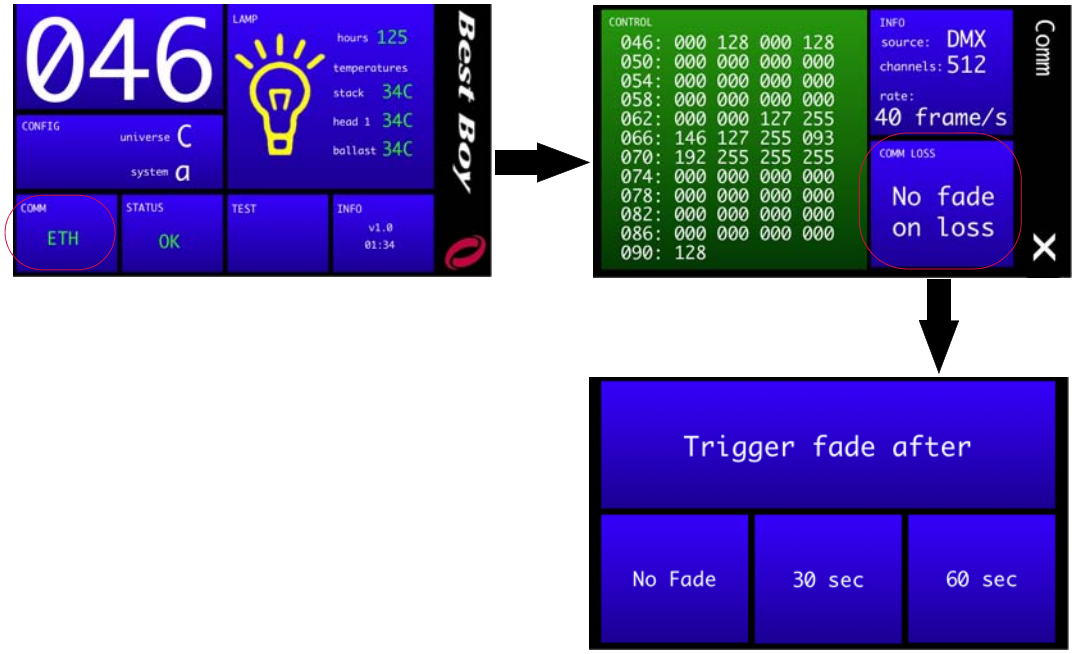


Figure 2-19: Configuring Comm Loss Setting

Configuring Universe, Comm, and Other Options

Other luminaire configurations can be set using the menu screens available at the Menu Touchscreen. Refer to "Menu System" on page 30 for complete instructions on using these features.

3.

OPERATION

This chapter contains instructions for using the menu system and controlling the luminaire by DMX512.

+ MENU SYSTEM

+ DMX512 OPERATION

MENU SYSTEM

Using the Menu Touchscreen

The menu system is a set of software screens used to configure, address, report status, and test the luminaire. These functions are controlled at the Menu Touchscreen as shown in **Figure 3-1**.

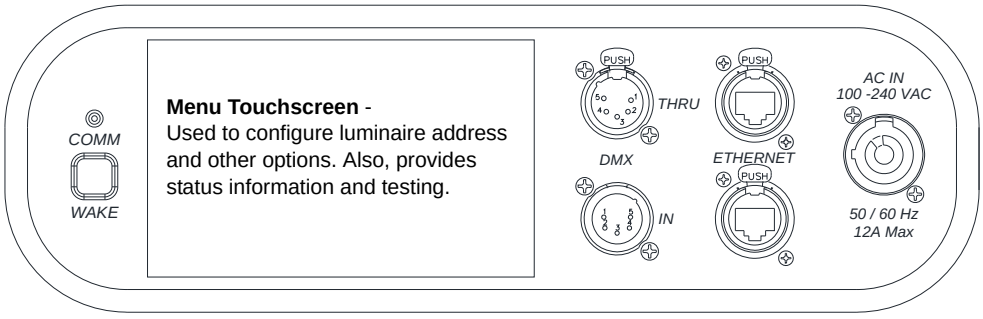


Figure 3-1: Menu Touchscreen

Color Codes

The menu panels are color coded as follows:

- **Blue** - function control panels. These are configurable functions which will open a sub-menu when touched.
- **Green** - informational panels. These display status info and will not open further menus when touched.
- **Red** - important control panels. These are configurable functions which will open a sub-menu when touched. Activating these functions will affect important luminaire settings.

Navigation

To navigate the menus, press the blue or red areas of the touchscreen.

Screen Saver Mode

The menu will automatically return to the Home screen, from a sub-menu, if inactive for 45 seconds. The display will go into screen saver mode (backlight off) if inactive for five minutes.

The menu will automatically jump to the Status screen and wake up the display when a mechanism status changes (error, calibration, etc.).

Bypass Calibration

If the menu screen is touched (in the center) and held during startup, the luminaire will present a menu that provides the option to bypass calibration. This feature allows the luminaire to skip the calibration sequence so that it can be powered up in the case for configuration purposes. (Refer to "Bypassing Calibration" on page 24.)

Wake Switch

The Best Boy 4000 Luminaire contains an on-board battery so that it can be addressed and configured without being connected to main power. A Battery Wake Switch, located near the menu touchscreen, can be used to access the menu system as required.

- Press the switch once to bring up the power down menu.
- Press and hold the switch to force a power down.

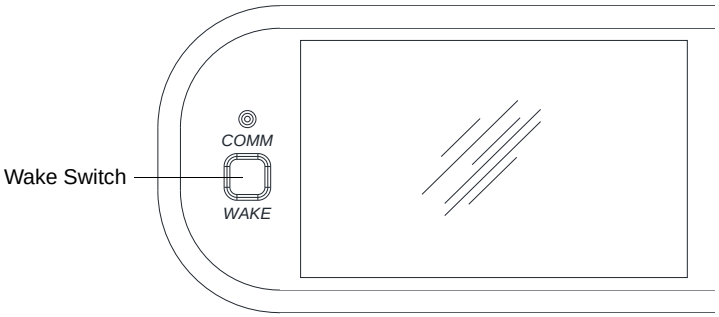


Figure 3-2: Wake Switch

Menu System Overview

The menu system consists of a hierarchy of menu levels. Sub-menus, options, and alpha/numeric keypads may be accessed by pressing the blue and red areas of these main screens. Pressing the right bar (X) while at a sub-menu will return to the previous screen.

When power is applied to the luminaire, the Menu Touchscreen will display an initialization screen during calibration. After calibration is complete, the Home screen will be displayed.

The main menu structure is illustrated below:

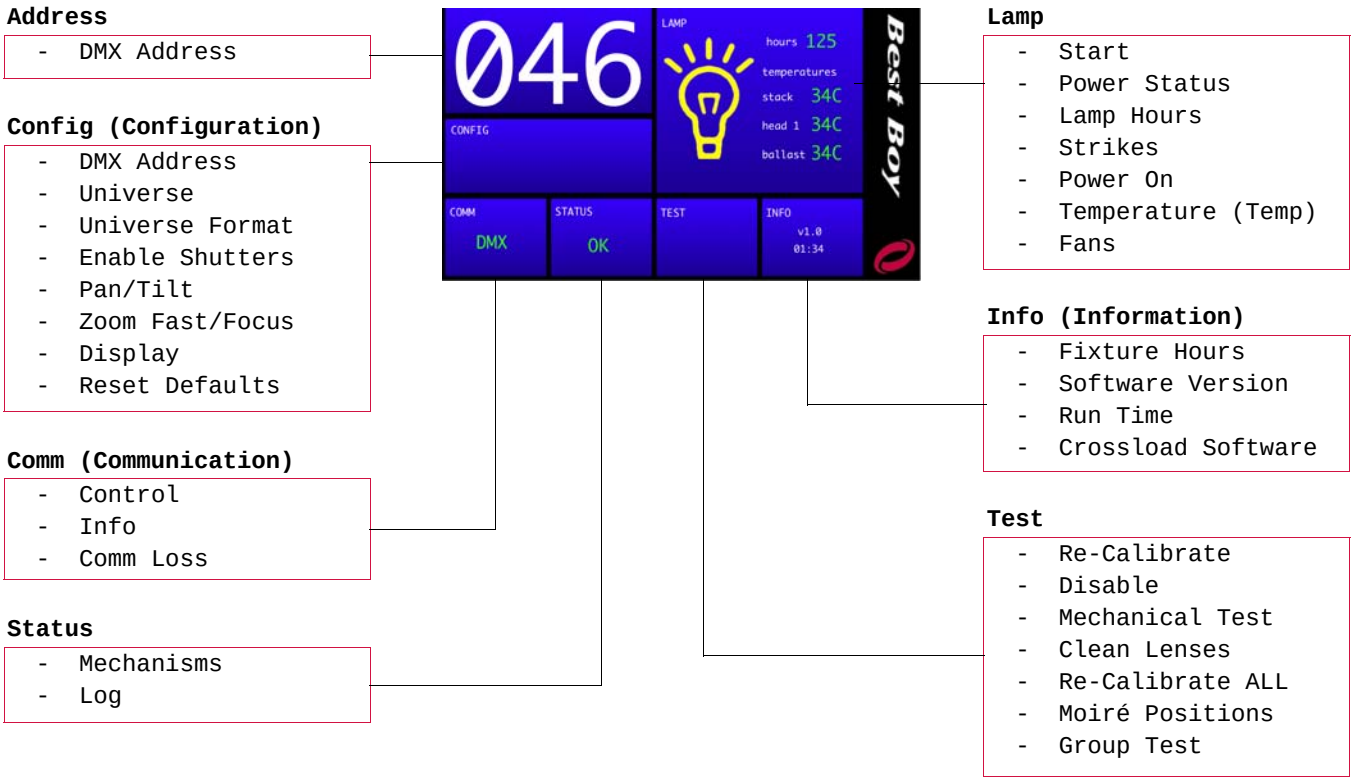
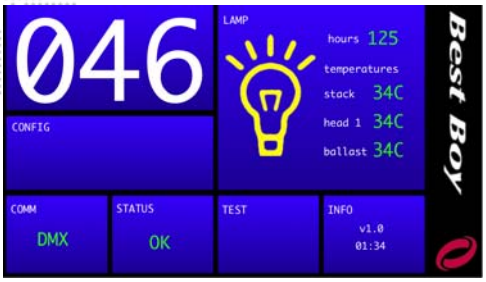


Figure 3-3: Menu Structure

Home Screen

The Home screen consists of several sections (referred to as "panels") which provide status and configuration information. Pressing the panels on the touchscreen will open the applicable sub-menus.



Home Screen

Address (#)

The large number (046 in the example screen) is the current DMX address of the luminaire.

Press panel to bring up the numeric keypad for editing.

LAMP

- **Lamp Status** - displays lamp on/off status, hours, and temperatures. The lamp icon color indicates status of lamp: off = gray icon, on = yellow icon (shown in example at right), error = red icon.
- **Lamp Hours** - displays total lamp hours. Lamp hours are shown in green if under threshold, yellow at 650 hours, and red at 750 hours. *It is mandatory that the lamp be changed before 750 hours.*
- **Temperatures** - displays luminaire head temperatures. The temperatures are shown in green if under limit, yellow if close to the limit, and red if over the limit.

Press panel to open Lamp Screen.

CONFIG

Press panel to open Configuration Screen.

COMM

- **Comm** - displays currently active input protocol: ETH (green), DMX (green) or NONE (red).

Press panel to open Communication Screen.

STATUS

- **Status** - displays fixture status: CAL (yellow), OK (green), or ERR (red).

Press panel to open Status Screen.

TEST

Press panel to open Test Screen.

INFO

- **Run Time** - displays current software version and run time in *hours:minutes* format.

Press panel to open Information Screen.

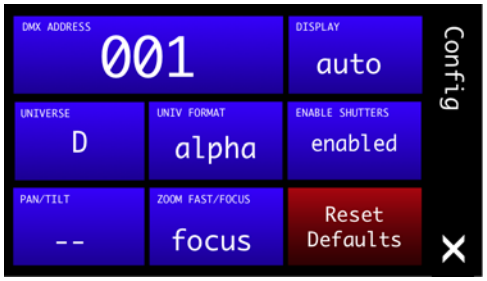
Lamp Screen

Lamp Screen

+ **Start/Douse** - displays current lamp status and power setting. Press START/DOUSE to bring up Yes/No options (depending on current lamp state).
+ **Lamp Power** - displays lamp power status as a percentage.
+ **Lamp Hours**- displays total lamp hours. Lamp hours are shown in green if under threshold, yellow at 650 hours, and red at 750 hours. *It is mandatory that the lamp be changed before 750 hours.* Press to bring up Reset Lamp Hours Yes/No options.
+ **Strikes** - displays number of times the lamp has been struck. Press to bring up Reset Lamp Hours Yes/No options.
+ **Power On** - sets option to strike lamp automatically upon power up. Press to bring up Wait/Start options.
+ **Temp** - displays temperatures in Celsius and Fahrenheit. The temperature is shown in green if under limit, yellow at 80°C, and red at 90°C. At 90°C the lamp will douse.
+ **Fans** - displays fan status as OK if fan is running, or ERR (red) if fan is not running.

Press (X) to return to Home Screen.

Configuration Screen



Config Screen

+ **DMX Address** - displays current DMX512 address. Press to bring up numeric keypad for inputing the address.
+ **Display** - configures orientation of the Menu Touchscreen. Press to bring up Auto/Up/Down options.
+ **Universe** - displays current universe. Press to bring up alpha keypad or numeric keypad (based on universe format selection).
+ **Universe Format** - displays alpha/numeric universe format. Press to bring up Alpha/Numeric options.
+ **Enable Shutters** - displays current frame setting. Press to bring up Enable/Disable options.
+ **Pan/Tilt** - displays summary of pan/tilt settings:

  lock = pan or tilt is locked.*
  swap = pan/tilt is swapped.
  invert = pan or tilt is inverted.
  free = "free" control is enabled (for operating fixture as a follow spot).
  Press to bring up Pan/Tilt Screen.
+ **Zoom Fast/Focus** - option which allow the zoom to move as fast as possible (Fast), or to move a little slower and retain focus while zooming (In Focus). Press to bring up Focus/Fast options.
+ **Reset Defaults** - resets all configuration settings and address to default values. Press to bring up "Reset All Defaults" Yes/No options. Default settings are as follows:

  - Address: 001
  - Universe: A
  - Universe Setting: alpha
  - P/T: unlocked
  - P/T: standard (not inverted or swapped)
  - Lamp Power Up: wait
  - Zoom: in focus
  - Display: auto

Press (X) to return to Home Screen.

* When Pan and/or Tilt are locked, it prevents the fixture from moving when the power is reset. For example, if a fixture is placed within a piece of scenery that could interfere with Pan and Tilt calibration, they can be locked so that only the internal mechanisms calibrate.

Pan/Tilt Screen

- **Invert Pan / Invert Tilt** - displays current invert settings. Press to bring up Invert Yes/No options. When inverted, pan/tilt will move in the opposite direction.
- **Swap** - displays current swap setting. Press to bring up Swap Pan/Tilt Yes/No options. When swapped, the pan channel will control tilt and vice versa.
- **Free** - displays the current "free" setting. Press to bring up Yes/No options. Yes will enable "free" control, which allows the luminaire to be used as a follow spot.
- **Lock Pan/Tilt** - displays current lock setting. Press to bring up Lock Yes/No options. When locked, a mechanism will not release brake or calibrate, only remain in its fixed position.

Once configured, any Pan/Tilt settings will be displayed in the CONFIG panel of the Home screen as shown in the example to the right.

Press (X) to return to Lamp Screen.

Pan/Tilt Screen

Communication Screen

- **Control** - displays current DMX512 control values. Values will be highlighted in green when changing.
- **Info** - displays current source (DMX512 or Art-Net/Ethernet), number of bytes in the frame, update rate, and universe number (if Art-Net). Press INFO to bring up the Comm Stats screen.
- **Comm Loss** - configures how long to wait before the fixture fades to black upon loss of comm data. Press COMM LOSS to bring up "Set Trigger Fade After" option. Set to No Fade, 30 Seconds or 60 Seconds. (Also refer to "Configuring Comm Loss Setting" on page 28.)

Press (X) to return to Home Screen.

Comm Screen

Comm Stats Screen

Status Screen

- **Mechanisms** - displays mechanism status. Mechanism names will be shown in yellow while calibrating, then change to green if okay or red if an error exists. Locked mechanisms will be shown in white. Press to bring up Test Screen.
- **Log** - displays system status log. The log entries are stored in persistent memory and are retained through power down. Use touchscreen arrows to scroll up or down. Press CLR to bring up Clear Log Yes/No options.

Press (X) to return to Home Screen.

Status Screen

Information Screen

Info Screen

+ **Fixture Hours** - displays total number of hours that the fixture has been operated.
+ **Run Time** - displays current run time in *hours:minutes* format.
+ **Software Version** - displays operating software date and time, along with Boot and Shutter versions.
+ **Crossload Software** - allows the luminaire to send its software version out over the DMX512 and Ethernet lines to other connected luminaires in the daisy-chain. (See "Software Crossload" on page 61 for more explanation of this function.)

Press (X) to return to Home Screen.

Test Screen

Test Screen

+ **Recalibrate** - press to bring up Recalibration Screen. (During recalibration, intensity goes out until all mechanism calibrations are complete and back in position, then fades in.)
+ **Recal All** - press to bring up Recalibrate All Yes/No options.
+ **Disable** - press to bring up Disable Screen, which allows specific mechanisms to be disabled during testing.
+ **Moiré Positions** - press to bring up Moiré Gobos screen, which provides a way to specify the wheel positions containing Moiré gobos. Moiré gobos contain two pieces of glass: one that is fixed and another that rotates. Due to this construction they do not contain sensors, and therefore cannot be calibrated to a certain orientation at startup as with standard gobos.
+ **Mech Test** - press to bring up Mechanical Tests Screen. (See "Mechanical Tests" on page 58 for more explanation.)
+ **Group Test** - press to bring up Group Tests screen, which allows multiple luminaires to be run through a configurable test sequence when chained together via DMX512 or Ethernet. (See "Group Tests" on page 59 for more explanation.)
+ **Clean Lenses** - press to bring up Cleaning Lenses screen. This feature will position lenses so that all surfaces may be cleaned with a cloth. (Note that pressing the buttons does not actually clean the lenses.)
+ **Fuse Map** - press to bring up Fuse Map screen. The Fuse Map provides the circuit board location for all mechanism fuses.

Press (X) to return to Home Screen.

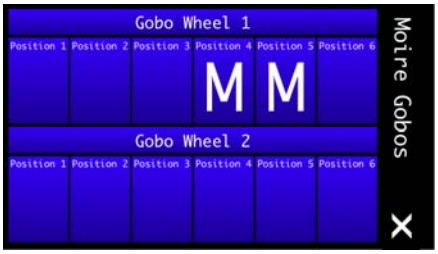
Test Sub-Menu Screens

Recalibrate Screens - Specifies a specific mechanism for recalibration.

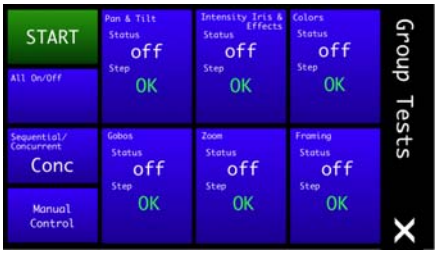
Disable Screen - Specifies mechanisms to be excluded from tests.

Mechanical Tests Screen - Specifies mechanisms to be tested.

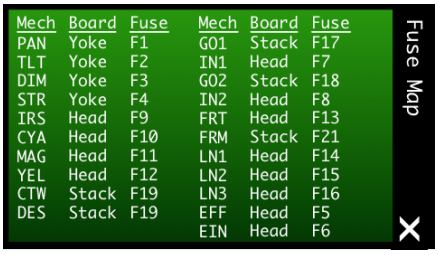
Cleaning Lenses Screen - Positions lenses so that they may be easily cleaned with a cloth.


Gobo Wheel 1
Position 1 Position 2 Position 3 Position 4 Position 5 Position 6
M M
Gobo Wheel 2
Position 1 Position 2 Position 3 Position 4 Position 5 Position 6
Moire Gobos

Moiré Gobos Screen - Provides a way to specify which wheel positions contain Moiré gobos (M).



Group Tests Screen - Allows multiple luminaires to be tested when daisy-chained together.


Mech Board Fuse Mech Board Fuse
PAN Yoke F1 GO1 Stack F17
TLT Yoke F2 IN1 Head F7
DIM Yoke F3 GO2 Stack F18
STR Yoke F4 IN2 Head F8
IRS Head F9 FRT Head F13
CYA Head F10 FRM Stack F21
MAG Head F11 LN1 Head F14
YEL Head F12 LN2 Head F15
CTW Stack F19 LN3 Head F16
DES Stack F19 EFF Head F5
EIN Head F6
Fuse Map

Fuse Map - Provides the circuit board location for all mechanism fuses.

DMX512 OPERATION

DMX Channel Mapping

Table 3-1: Best Boy DMX Channel Mapping

Channel	Function	Description	8-Bit	16-Bit
1	**INTENSITY**	Intensity Adjustment	home: 0	
		Out	0	
		Full	255	
2	**PAN**	Pan linear coarse adjustment	home: 127	32768
		0°	0	
		615°	255	
3	Pan Fine	Pan fine adjustment	home: 0	
4	**TILT**	Tilt linear coarse adjustment	home: 127	32768
		0°	0	
		260°	255	
5	Tilt Fine	Tilt fine adjustment	home: 0	
6	**CYAN**	Cyan Color Mix	home: 0	
	Mix	[Mode: Continuous]	0-255	
		Open	0	
		Full	255	
	Wheel Spin	[Mode: Spin]	0-255	
		Clockwise	0-126	
		Fast	0	
		Slow	126	
		Stop	127-128	
		Counter-Clockwise	129-255	
		Slow	129	
		Fast	255	
7	**YELLOW**	Yellow Color Mix	home: 0	
	Mix	[Mode: Continuous]	0-255	
		Open	0	
		Full	255	
	Wheel Spin	[Mode: Spin]	0-255	
		Clockwise	0-126	
		Fast	0	
		Slow	126	
		Stop	127-128	
		Counter-Clockwise	129-255	
		Slow	129	
		Fast	255	
8	**MAGENTA**	Magenta Color Mix	home: 0	
	Mix	[Mode: Continuous]	0-255	
		Open	0	
		Full	255	
	Wheel Spin	[Mode: Spin]	0-255	
		Clockwise	0-126	
		Fast	0	
		Slow	126	
		Stop	127-128	

Table 3-1: Best Boy DMX Channel Mapping (Continued)

Channel	Function	Description	8-Bit	16-Bit
		Counter-Clockwise	129-255	
		Slow	129	
		Fast	255	
9	COLOR MIX CONTROL	Sets color mix control mode	home: 0	
		Continuous	0-9	
		Spin Cyan	10-19	
		Spin Yellow	20-29	
		Spin Magenta	30-39	
		Spin ALL mixers	40-49	
		Reserved	50-255	
10	COLOR TEMPERATURE	Linear color temperature adjustment	home: 50	
		7500k	0	
		Open	50	
		3000k	255	
11	DESIGNER COLOR	Color Wheel Choice	home: 0	
	Color Choice	[Mode: Continuous, Discrete, Strobe]	0-255	
		Open	0	
		Open / Color 1	26	
		Color 1	32	
		Color 1 / Color 2	42	
		Color 2	64	
		Color 2 / Color 3	79	
		Color 3	96	
		Color 3 / Color 4	114	
		Color 4	128	
		Color 4 / Color 5	145	
		Color 5	160	
		Color 5 / Color 6	175	
		Color 6	192	
		Color 6 / Color 7	208	
		Color 7	224	
		Color 7 / Open	232	
		Open	255	
	Wheel Spin	[Mode: Spin]	0-255	
		Clockwise	0-126	
		Fast	0	
		Slow	126	
		Stop	127-128	
		Counter-Clockwise	129-255	
		Slow	129	
		Fast	255	
12	DESIGNER CONTROL	Sets Designer Wheel control mode	home: 0	
		Continuous	0-9	
		Discrete	10-19	
		Spin	20-39	
		Strobe Random - Slow	40-43	
		Strobe Random - Medium	44-46	
		Strobe Random - Fast	47-49	
		Linear Strobe Rate	50-255	

Table 3-1: Best Boy DMX Channel Mapping (Continued)

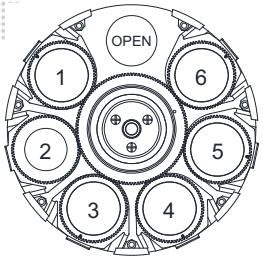
Channel	Function	Description	8-Bit	16-Bit
		Slow	50	
		Fast	255	
13	**GOBO 1**	Rotating Gobo 1 Choice / Modifier	home: 0	0
		*Discrete Choice*	0-64	0-16383
		Open	0-9	0-2339
		Gobo 1	10-18	2340-4679
		Gobo 2	19-27	4680-7019
		Gobo 3	28-35	7020-9359
		Gobo 4	36-45	9360-11699
		Gobo 5	46-54	11700-14039
		Gobo 6	55-63	14040-16383
		Continuous Choice	64-191	16384-49150
		Open	64	16384
		Open / Gobo 1	74	18850
		Gobo 1	82	21014
		Gobo 1 / Gobo 2	91	23400
		Gobo 2	100	25661
		Gobo 2 / Gobo 3	109	27980
		Gobo 3	118	30284
		Gobo 3 / Gobo 4	128	32760
		Gobo 4	137	34966
		Gobo 4 / Gobo 5	147	37543
		Gobo 5	155	39642
		Gobo 5 / Gobo 6	163	41833
		Gobo 6	173	44288
		Gobo 6 / Open	182	46513
		Open	191	49150
		Wheel Spin	192-255	49152-65535
		Clockwise	192-223	49152-57343
		Fast	192	49152
		Slow	222	57087
		Stop	223-224	57088-57599
		Counter-Clockwise	225-255	57600-65535
		Slow	225	57600
		Fast	255	65535
14	Gobo 1 Fine	Gobo 1 fine adjustment	home: 0	
15	**GOBO 1 INDEX**	Rotating Gobo 1 Index Modifier	home: 96	24575
		Index Position	0-191	0-48896
		0°	0	0
		180°	96	24575
		360°	191	49151
		Index Rotation	192-255	49152-65535
		Clockwise	192-223	49152-57343
		Fast	192	49152
		Slow	222	57087
		Stop	223-224	57088-57599
		Counter-Clockwise	225-255	57600-65535
		Slow	225	57600
		Fast	255	65535

Table 3-1: Best Boy DMX Channel Mapping (Continued)

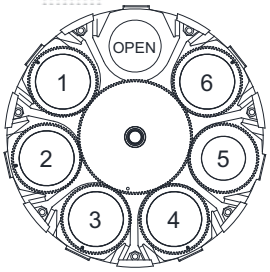
Channel	Function	Description	8-Bit	16-Bit
16	Gobo 1 Index Fine	Gobo 1 Index fine adjustment	home: 0	
17	**GOBO 2**	Rotating Gobo 2 Choice / Modifier	home: 0	0
		*Discrete Choice*	0-63	0-16383
		Open	0-9	0-2339
		Gobo 1	10-18	2340-4679
		Gobo 2	19-27	4680-7019
		Gobo 3	28-36	7020-9359
		Gobo 4	37-45	9360-11699
		Gobo 5	46-54	11700-14039
		Gobo 6	55-63	14040-16383
		Continuous Choice	64-191	16384-49150
		Open	64	16384
		Open / Gobo 1	74	18850
		Gobo 1	82	21014
		Gobo 1 / Gobo 2	91	23400
		Gobo 2	100	25661
		Gobo 2 / Gobo 3	109	27980
		Gobo 3	118	30284
		Gobo 3 / Gobo 4	128	32760
		Gobo 4	137	34966
		Gobo 4 / Gobo 5	147	37543
		Gobo 5	155	39642
		Gobo 5 / Gobo 6	163	41833
		Gobo 6	173	44288
		Gobo 6 / Open	182	46513
		Open	191	49150
		Wheel Spin	192-255	49152-65535
		Clockwise	192-223	49152-57343
		Fast	192	49152
		Slow	222	57087
		Stop	223-224	57088-57599
		Counter-Clockwise	225-255	57600-65535
		Slow	225	57600
		Fast	255	65535
18	Gobo 2 Fine	Gobo 2 fine adjustment	home: 0	
19	**GOBO 2 INDEX**	Rotating Gobo 2 Index Modifier	home: 96	24575
		Index Position	0-191	0-48896
		0°	0	0
		180°	96	24575
		360°	191	48896
		Index Rotation	192-255	49152-65535
		Clockwise	192-223	49152-57343
		Fast	192	49152
		Slow	222	57087
		Stop	223-224	57088-57599
		Counter-Clockwise	225-255	57600-65535
		Slow	225	57600
		Fast	255	65535
20	Gobo 2 Index Fine	Gobo 2 Index fine adjustment	home: 0	

Table 3-1: Best Boy DMX Channel Mapping (Continued)

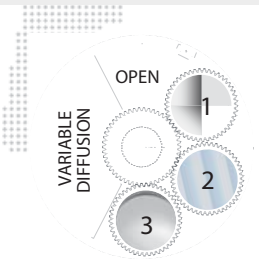
Channel	Function	Description	8-Bit	16-Bit
21	**EFFECT**	Effect control	home: 146	
		*Discrete Choice*	0-63	
		Gag 3 (Oblong)	0-35	
		Gag 2 (Extruder)	36-71	
		Gag 1 (4-Facet Prism)	72-107	
		Open	108-146	
		Variable Frost	147-255	
		Open	147	
		Full	255	
22	**EFFECT INDEX**	Effect Index control	home: 96	home: 24575
		Index Position	0-191	0-48896
		0°	0	0
		360°	191	48896
		Index Rotation	192-255	49152-65535
		Clockwise	192-223	49152-57343
		Fast	192	49152
		Slow	222	57087
		Stop	223-224	57088-57599
		Counter-Clockwise	225-255	57600-65535
		Slow	225	57600
		Fast	255	65535
23	Effect Fine	Effect fine adjustment	home: 0	
24	**ZOOM**	Zoom coarse adjustment	home: 94	home: 24064
		8° (narrow)	0	0
		64° (wide)	255	65535
25	Zoom Fine	Zoom fine adjustment	home: 0	
26	**EDGE**	Edge coarse adjustment	home: 255	home: 65535
		Near	0	0
		Far	255	65535
27	Edge Fine	Edge fine adjustment	home: 255	
28	**BEAM IRIS**	Iris control	home: 255	
		Small	0	
		Large	255	
29	**STROBE**	Strobe adjustment	home: 0	
		Open	0-9	
		Closed	10-19	
		Pulse Clockwise	20-39	
		Fast	20	
		Slow	39	
		Pulse Counter-Clockwise	40-59	
		Slow	40	
		Fast	59	
		Ceiling Fan Clockwise	60-79	
		Fast	60	
		Slow	79	
		Ceiling Fan Counter-Clockwise	80-99	
		Slow	80	
		Fast	99	
		Slow Random	100-102	

Table 3-1: Best Boy DMX Channel Mapping (Continued)

Channel	Function	Description	8-Bit	16-Bit
		Medium Random	103-106	
		Fast Random	107-109	
		Speed	110-255	
		Slow	110	
		Fast	255	
30	**MACRO**	Macro Control	home: 0	
	Macro control overrides the DMX control for that parameter.	None	0	
		Iris - square wave	1	
		Iris - sine wave	2	
		Iris - sawtooth	3	
		Iris - reverse sawtooth	4	
		Iris close	5	
		Iris open	6	
		Zoom/Iris close	7	
		Zoom/Iris open	8	
		Framing - square wave	9	
		Framing - sine wave	10	
		Framing - sawtooth	11	
		Framing - reverse sawtooth	12	
		Framing close	13	
		Framing open	14	
		Zoom/Framing close	15	
		Zoom/Framing open	16	
		Iris/Framing alternate square wave	17	
		Iris/Framing alternate sine wave	18	
		Frost - sine wave	19	
		Frost - sawtooth	20	
		Frost - reverse sawtooth	21	
		Edge - sine wave	22	
		Edge - sawtooth	23	
		Edge - reverse sawtooth	24	
		Fire	25	
		Water	26	
		Clouds	27	
31	**MACRO SPEED**	Macro Speed control	home: 0	
		Speed Range	0-246	
		Slow	0	
		Fast	246	
		Random Speed - Slow Rate	247-249	
		Random Speed - Medium Rate	250-252	
		Random Speed - Fast Rate	253-255	
32	**FOCUS TIME**	Refer to "Timing Channels" on page 46	home: 255	
33	**COLOR TIME**		home: 255	
34	**IMAGE TIME**		home: 255	
35	**BEAM TIME**		home: 255	

Table 3-1: Best Boy DMX Channel Mapping (Continued)

Channel	Function	Description	8-Bit	16-Bit
36	CONTROL	Control Channels	home: 0	
	All values must be held for a minimum of 3 seconds to take effect.	Idle	0	
		Recalibrate: All	10	
		Recalibrate: Zoom/Edge and Effects	12	
		Recalibrate: Color	14	
		Recalibrate: Gobos	16	
		Recalibrate: Framing Blades	17	
		Recalibrate: Dimmer/Strobe/Iris	18	
		Recalibrate: Pan/Tilt	19	
		Lamp: Douse	20	
		Lamp: Start	30	
		Zoom Table Select: 15˚ Throw	56	
		Zoom Table Select: 25˚ Throw	58	
		Zoom Table Select: 30˚ Throw (default)	60	
		Zoom Table Select: 42˚ Throw	62	
		Zoom Table Select: 58˚ Throw	64	
		Zoom Table Select: 80˚ Throw	66	
		Zoom Table Select: 112˚ Throw	68	
		Zoom Table Select: 155˚ Throw	70	
		Zoom Table Select: 215˚ Throw	72	
		Zoom Table Select: 300˚ Throw	74	
		Zoom Speed Select: Maintain Focus (default)	75	
		Zoom Speed Select: Move Fast	77	
		Gobo: Set Zero Position	80	
		Display: Turn Backlight ON	90	
		Display: Turn Backlight OFF	95	
		Pan: Lock	100	
		Pan: Unlock	102	
		Tilt: Lock	104	
		Tilt: Unlock	106	
		Pan/Tilt: Free Motion	108	
		Pan/Tilt: Free Lock	110	
		Pan/Tilt: End Free Motion	112	
		No Fade Out	114	
		Fade Out After 30s	116	
		Fade Out After 60s	118	
		Clear Logs	120	
		Invert Pan	122	
		Don't Invert Pan	124	
		Invert Tilt	126	
		Don't Invert Tilt	128	
		Swap Pan/Tilt	130	
		Don't Swap Pan/Tilt	132	

Table 3-1: Best Boy DMX Channel Mapping (Continued)

Channel	Function	Description	8-Bit	16-Bit
37	FRAMING 1	Blade 1A Position	home: 0	Framing channels can be disabled or enabled using the "Enable Shutters" option at the CONFIG menu. Refer to page 33.
		Open	0	
		Inserted	255	
38	FRAMING 2	Blade 1B Position	home: 0	
		Open	0	
		Inserted	255	
39	FRAMING 3	Blade 2A Position	home: 0	
		Open	0	
		Inserted	255	
40	FRAMING 4	Blade 2B Position	home: 0	
		Open	0	
		Inserted	255	
41	FRAMING 5	Blade 3A Position	home: 0	
		Open	0	
		Inserted	255	
42	FRAMING 6	Blade 3B Position	home: 0	
		Open	0	
		Inserted	255	
43	FRAMING 7	Blade 4A Position	home: 0	
		Open	0	
		Inserted	255	
44	FRAMING 8	Blade 4B Position	home: 0	
		Open	0	
		Inserted	255	
45	FRAMING ROTATE	Blade rotation control	home: 128	
		(-) Angle	0	
		Center	128	
		(+) Angle	255	

Special Notes

Macros

The Best Boy 4000 Luminaire offers 27 pre-defined sequences, called Macros, which allow for quick and easy control of luminaire functions such as iris, zoom, framing, and more.

Macro control overrides the DMX control for that parameter. For example, if an iris macro is running, then the DMX control for iris will not have any effect. Some macros also control multiple functions.

Gobo: Set Zero Position

Set Zero Position Allows adjustment of the gobo wheel home position. Refer to "Gobo Set Zero Position" on page 50.

Zoom Tables

The zoom tables, which allow the fixture to maintain sharp focus on an image throughout the zoom range, are sensitive to the throw distance. For this reason, a variety of zoom table versions are available for use with different throws. The Zoom Table Select values are handled live to allow cue recall with different zoom tables. If the zoom value changes and the control channel is on one of the zoom select values, the indicated zoom table will be used for that zoom recall.

Note also that zoom table select is not persistent between power cycles, it always resets to the default 30' table at power-up.

Framing

The Framing channels are optional, as controlled by the "Enable Shutters" menu selection. (Refer to "Configuration Screen" on page 33.)

The blade positions are as follows:

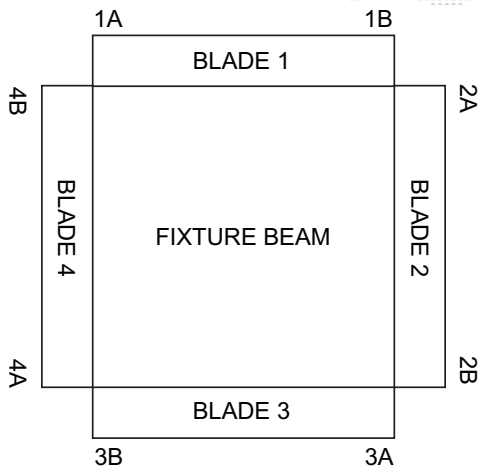


Figure 3-4: Blade Positions

Timing Channels

Channel Functions

Timing channel control improves the timed moves of certain groups of parameters. Four timing channels are provided for this purpose: Focus, Color, Beam, and Image.

Timing channels support time values of up to six minutes.

Table 3-2: Timing Channel Allocations

Channel Function	Timing Channel
Pan	Focus
Tilt	
Cyan	Color
Yellow	
Magenta	
Color Wheel	
Zoom	Beam
Edge	
Iris	
Framing	
Rotating Gobo Wheels 1 & 2	Image
Gobo Index 1 & 2	
Effects Wheel	
Effects Index	

Timing Channel Mapping

Refer to the **Timing Channels Table** starting on the next page. The following guidelines apply:

+ A timing value of zero is full speed.
+ A time value of 100% (or 255 in DMX) causes the associated parameter(s) to follow cue fade time (console time) rather than the timing channel.
+ Timing channels can be set in either % or 0-255 (DMX) modes, with the values assigned - as shown in the tables.

Table 3-3: Timing Channels

% Value	DMX	= Seconds
	0	Full Speed
	1	0.2
	2	0.4
1	3	0.6
	4	0.8
2	5	1
	6	1.2
	7	1.4
3	8	1.6
	9	1.8
4	10	2
	11	2.2
	12	2.4
5	13	2.6
	14	2.8
6	15	3
	16	3.2
	17	3.4
7	18	3.6
	19	3.8
8	20	4
	21	4.2
	22	4.4
9	23	4.6
	24	4.8
10	25	5
	26	5.2
	27	5.4
11	28	5.6
	29	5.8
	30	6
12	31	6.2
	32	6.4
13	33	6.6
	34	6.8
	35	7.0
14	36	7.2
	37	7.4
15	38	7.6
	39	7.8
	40	8
16	41	8.2
	42	8.4
17	43	8.6
	44	8.8
	45	9
18	46	9.2
	47	9.4
19	48	9.6
	49	9.8
	50	10
20	51	10.2

Table 3-3: Timing Channels (Continued)

% Value	DMX	= Seconds
	52	10.4
	53	10.6
21	54	11
	55	11
22	56	12
	57	12
	58	13
23	59	13
	60	14
24	61	14
	62	14
	63	15
25	64	15
	65	16
26	66	16
	67	16
	68	17
27	69	17
	70	18
28	71	18
	72	18
	73	19
29	74	19
	75	20
30	76	20
	77	20
	78	21
31	79	21
	80	21
	81	22
32	82	22
	83	23
33	84	23
	85	23
	86	24
34	87	24
	88	25
35	89	25
	90	25
	91	26
36	92	26
	93	27
37	94	27
	95	27
	96	28
38	97	28
	98	29
39	99	29
	100	29
	101	30
40	102	30
	103	30
	104	31

Table 3-3: Timing Channels (Continued)

% Value	DMX	= Seconds
41	105	31
	106	32
42	107	32
	108	32
	109	33
43	110	33
	111	34
44	112	34
	113	34
	114	35
45	115	35
	116	36
46	117	36
	118	36
	119	37
47	120	37
	121	38
48	122	38
	123	38
	124	39
49	125	39
	126	39
	127	40
50	128	40
	129	41
51	130	41
	131	41
	132	42
52	133	42
	134	43
53	135	43
	136	43
	137	44
54	138	44
	139	45
55	140	45
	141	45
	142	46
56	143	46
	144	47
57	145	47
	146	47
	147	48
58	148	48
	149	49
59	150	49
	151	49
	152	50
60	153	50
	154	50
	155	51
61	156	51
	157	52

Table 3-3: Timing Channels (Continued)

% Value	DMX	= Seconds
62	158	52
	159	52
	160	53
63	161	53
	162	54
64	163	54
	164	54
	165	55
65	166	55
	167	56
66	168	56
	169	56
	170	57
67	171	57
	172	58
68	173	58
	174	58
	175	59
69	176	59
	177	59
	178	60
70	179	60
	180	65
71	181	65
	182	65
	183	70
72	184	70
	185	75
73	186	75
	187	75
	188	80
74	189	80
	190	85
75	191	85
	192	85
	193	90
76	194	90
	195	95
77	196	95
	197	95
	198	100
78	199	100
	200	110
79	201	110
	202	110
	203	120
80	204	120
	205	120
81	206	130
	207	130
	208	140
82	209	140
	210	140

Table 3-3: Timing Channels (Continued)

% Value	DMX	= Seconds
	211	150
83	212	150
	213	160
84	214	160
	215	160
	216	170
85	217	170
	218	180
86	219	180
	220	180
	221	190
87	222	190
	223	200
88	224	200
	225	200
	226	210
89	227	210
	228	210
	229	220
90	230	220
	231	230
91	232	230
	233	230
	234	240
92	235	240
	236	250
93	237	250
	238	250
	239	260
94	240	260
	241	270
95	242	270
	243	270
	244	280
96	245	280
	246	290
97	247	290
	248	290
	249	300
98	250	300
	251	310
99	252	310
	253	310
	254	310
100	255	Follows Cue Data

Gobo Set Zero Position

The Gobo Set Zero command allows adjustment of the gobo wheel's home position. When this command is issued, the luminaire sets the current wheel position as the "zero" position and stores this offset so it will be retained at the next startup. This allows correction for a sensor that may be slightly out of position causing the gobo wheel to not be perfectly centered and therefore obstructing part of the beam in the open position.

To set zero position:

Step 1. Using console, move wheel into desired center position.

Step 2. Execute Set Zero Position command (Control Channel DMX value 80). The luminaire will now remember the setting as the new zero position.

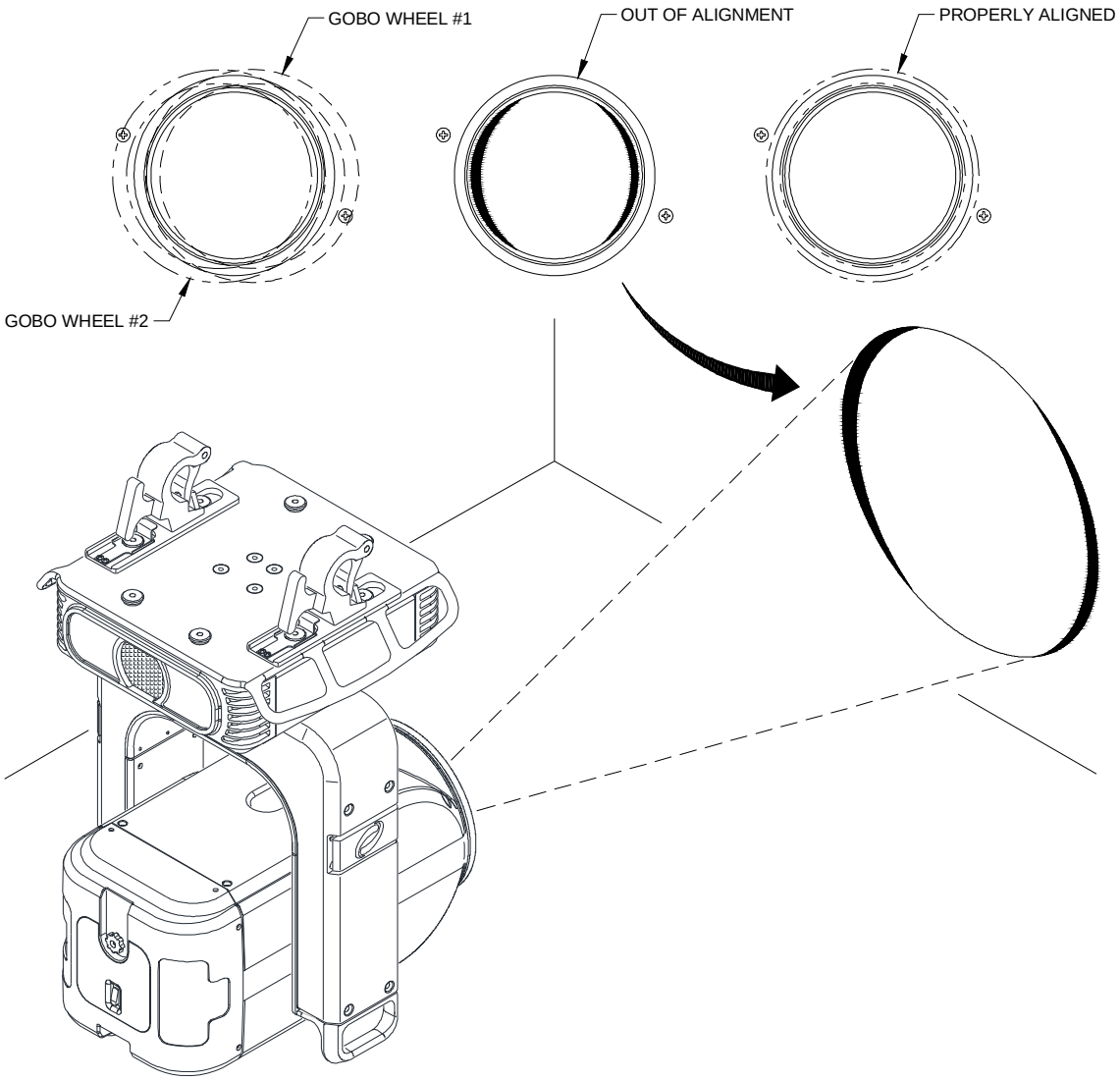


Figure 3-5: Gobo Alignment

4.

TROUBLESHOOTING AND MAINTENANCE

This chapter provides a basic troubleshooting guide, along with procedures for testing, proper handling, and routine maintenance.

+ TROUBLESHOOTING
+ TESTING
+ SOFTWARE UPDATE
+ EQUIPMENT HANDLING
+ ROUTINE MAINTENANCE

TROUBLESHOOTING

Troubleshooting Guide

The following table provides a list of common start-up problems and possible solutions.

Symptom	Solution(s)	Refer to...
No power to luminaire.	Ensure power cable is properly connected to Neutrik input connector.	page 10
	Ensure power is switched on at source (mains, disconnect box, etc.)	n/a
No console control.	Ensure DMX512 or Ethernet data cable is properly connected.	page 21
	Ensure DMX512 address setting is correct.	page 25
DMX512 control not working correctly throughout daisy-chain.	Ensure data cables are correctly configured.	page 21
	Ensure termination connector is installed at last luminaire in data link.	page 12
Lamp does not strike at power-up.	Configure lamp to start at power-up.	page 33
Comm LED is red indicating that no valid DMX or Ethernet signal is detected.	Ensure DMX512 or Ethernet data cable is properly connected. Check console.	page 21
No Ethernet control.	Ensure that luminaire is not also receiving a DMX signal. If both valid DMX and Ethernet control are being received, DMX control will take precedence.	page 24
Beam obstructed by gobo in open position.	Set new gobo zero position.	page 50
Luminaire won't take software update.	Remove active control (DMX512 or Art-Net).	page 61
Light spill occurring at some zoom angles.	Engage Light Shield.	page 20
Comm LED flashing red or green.	Indicates an internal error on the fixture. Check Status screen to isolate.	page 53

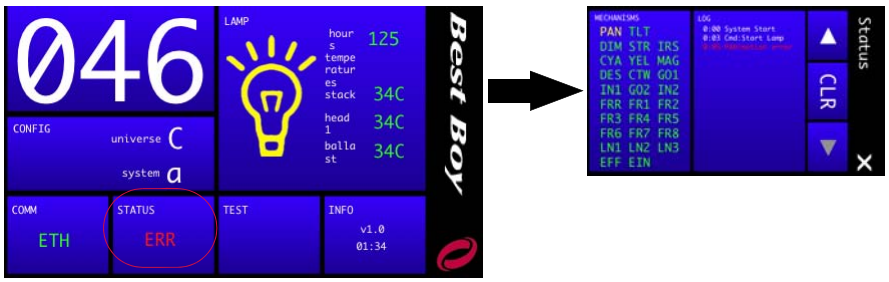
Errors

Status Indications

The STATUS panel at the Home screen will report overall luminaire conditions as follows:

+ CALIBRATION (yellow)
+ OK (green)
+ ERROR (red)
+ LOCKED (white)

Pressing the STATUS panel will bring up a detailed Status screen as shown below:



The Status screen will indicate which specific mechanisms, if any, have errors. It also provides a log of systems activity. The Status screen operates as follows:

+ **Mechanisms** - displays mechanism status. Mechanism names will be shown in yellow during calibration, green if okay, and red if an error exists. If an error exists, press the Mechanisms panel to bring up the Recalibration screen. Try recalibrating the mechanism(s) that is reporting the error.
+ **Log** - displays system log. Use touchscreen arrows to scroll up or down. Press CLR to bring up Clear Log Yes/No options.

Comm LED

In the case of a mechanism error, the Comm LED on the input panel will flash either red or green (depending on the comm state).

Figure 4-1: Comm LED

Mechanism Errors

Errors will be shown after the mechanism code, for example: PAN:Comm Error.

Error Code	Explanation	Solution
Cal Error	Error resetting position values in motion processor at beginning of calibration	Check CAN cables/connections, motor control board
Cal Timeout	An action during calibration took longer than expected	Check CAN cables/connections, motor control board
Comm Error	Error communicating with motion processor	Check CAN cables/connections, motor control board
Get Position Error	Error when retrieving current position from motion processor	Check CAN cables/connections, motor control board
Init Error	Error during initialization of motion processor	Check CAN cables/connections, motor control board
Motion Error	Mechanism's actual position is too far from its commanded position	Check mechanism motion
No Sensor	During calibration, no sensor was found in the range of travel	Check for mechanism motion, sensor operation
No Stop	Mechanism which calibrates to a physical stop did not find that stop	Check mechanism
Sensor Stuck	During calibration, could not find either edge of the sensor or the sensor did not turn off as expected	Check for mechanism motion, sensor operation
Spin Error	Error while sending spin command to motion processor	Check CAN cables/connections, motor control board
Stop Spin Error	Error while sending stop spin command to motion processor	Check CAN cables/connections, motor control board

Other Errors

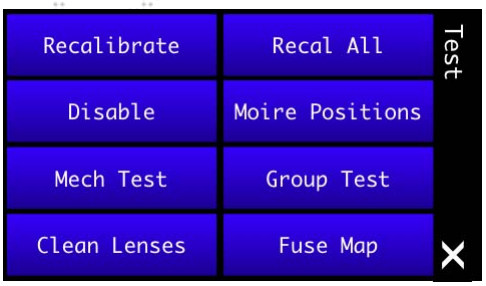
Error Code	Explanation	Solution
Ballast Errors: Parity, Overrun, Bad Header, Msg Too Long	Various ballast errors	Check ballast comm cable/connections
Ballast Heat Sink Over Temp	Ballast too hot	Check fans
Ballast Short Detected	Short circuit on ballast output	Check wiring
Ballast Timeout: Lamp Strike	Lamp failed to strike	Check igniter, lamp
CAN Comm Error	Stopped receiving CAN messages from motion processor	Check CAN cables/connections, motor control board
Crossload Timeout	Crossload execution took too long due to error	Remove any incoming DMX, retry
Data not crossload format	Data in memory is not proper format for crossload	Load software via computer
DMX busy: cancel crossload	Cannot execute crossload with traffic on DMX line	Remove incoming DMX control for cross load
DMX: UART transmit error	Transmit buffer busy when trying to send	Remove any incoming DMX, retry
Fuse Blown	One or more fuses are blown	Check fuse on specified board

Error Code	Explanation	Solution
Gobo out of zero range	When zeroing gobo wheels, the wheel is too far away from zero to set the position	Move wheel closer to home position before zero command
Head Fan Error	Fan not running properly	Check fan
In Free Mode: Can’t Lock	Free mode is enabled	Use pan/tilt menu to change from "free" to "lock"
Lamp Off	Fan Error: Cannot strike lamp while any fan is in error state	Check fan, fan cabling
Lamp Off: Over Temperature	Head temperature too high	Check fans
Lamp over threshold	Lamp hours above recommended maximum	Change lamp
Must Unlock via Free Option	Lock is enabled	Use pan/tilt menu to change from "lock" to "norm"
Plenum Fan Error	Fan not running properly	Check fan
PMD Motion Error	Mechanism's actual position is too far from its commanded position	Check mechanism motion
Framing Motor Disabled	Framing not running properly	Recalibrate, check mechanism motion
Stack Fan Error	One or more stack fans not running properly	Check fan, fan cabling
Temp over threshold	Temperature too high	Check fans/filters
Tip Fan Error	Fan not running properly	Check fan
UPE Fans Error	Upper Enclosure fans not running properly	Check fan, fan cabling
Yoke Fan Error	Fan not running properly	Check fan

TESTING

Test Screen

The Test menu provides options for using the luminaire's self-test features.



Test Screen

+ **Recalibrate** - press to bring up Recalibration Screen. (During recalibration, intensity goes out until all mechanism calibrations are complete and back in position, then fades in.)
+ **Recal All** - press to bring up Recalibrate All Yes/No options.
+ **Disable** - press to bring up Disable Screen, which allows specific mechanisms to be disabled during testing.
+ **Moiré Positions** - press to bring up Moiré Gobos screen, which provides a way to specify the wheel positions containing Moiré gobos. Moiré gobos contain two pieces of glass: one that is fixed and another that rotates. Due to this construction they do not contain sensors, and therefore cannot be calibrated to a certain orientation at startup as with standard gobos.
+ **Mech Test** - press to bring up Mechanical Tests Screen. (See "Mechanical Tests" on page 58 for more explanation.)
+ **Clean Lenses** - press to bring up Cleaning Lenses screen. This feature will position lenses so that all surfaces may be cleaned with a cloth. (Note that pressing the buttons does not actually clean the lenses.)
+ **Group Test** - press to bring up Group Tests screen, which allows multiple luminaires to be run through a configurable test sequence when chained together via DMX512 or Ethernet. (See "Group Tests" on page 59 for more explanation.)

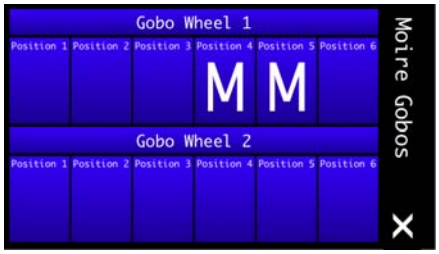
Test Sub-Menu Screens

Recalibrate Screens - Specifies a specific mechanism for recalibration.

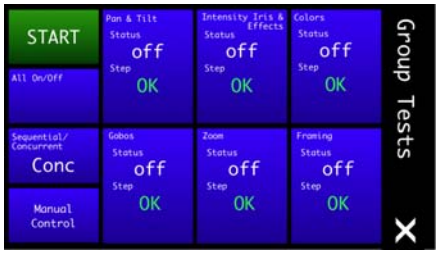
Disable Screen - Specifies mechanisms to be excluded from tests.

Mechanical Tests Screen - Specifies mechanisms to be tested.

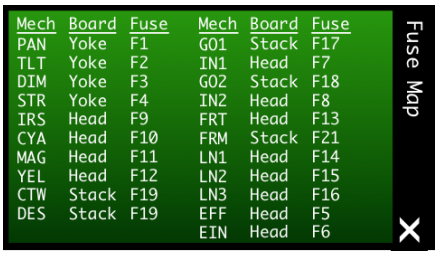
Cleaning Lenses Screen - Positions lenses so that they may be easily cleaned with a cloth.



Moiré Gobos Screen - Provides a way to specify which wheel positions contain Moiré gobos (M).



Group Tests Screen - Allows multiple luminaires to be tested when daisy-chained together.


Mech Board Fuse Mech Board Fuse
PAN Yoke F1 GO1 Stack F17
TLT Yoke F2 IN1 Head F7
DIM Yoke F3 GO2 Stack F18
STR Yoke F4 IN2 Head F8
IRS Head F9 FRT Head F13
CYA Head F10 FRM Stack F21
MAG Head F11 LN1 Head F14
YEL Head F12 LN2 Head F15
CTW Stack F19 LN3 Head F16
DES Stack F19 EFF Head F5
EIN Head F6
Fuse Map

Fuse Map - Provides the circuit board location for all mechanism fuses.

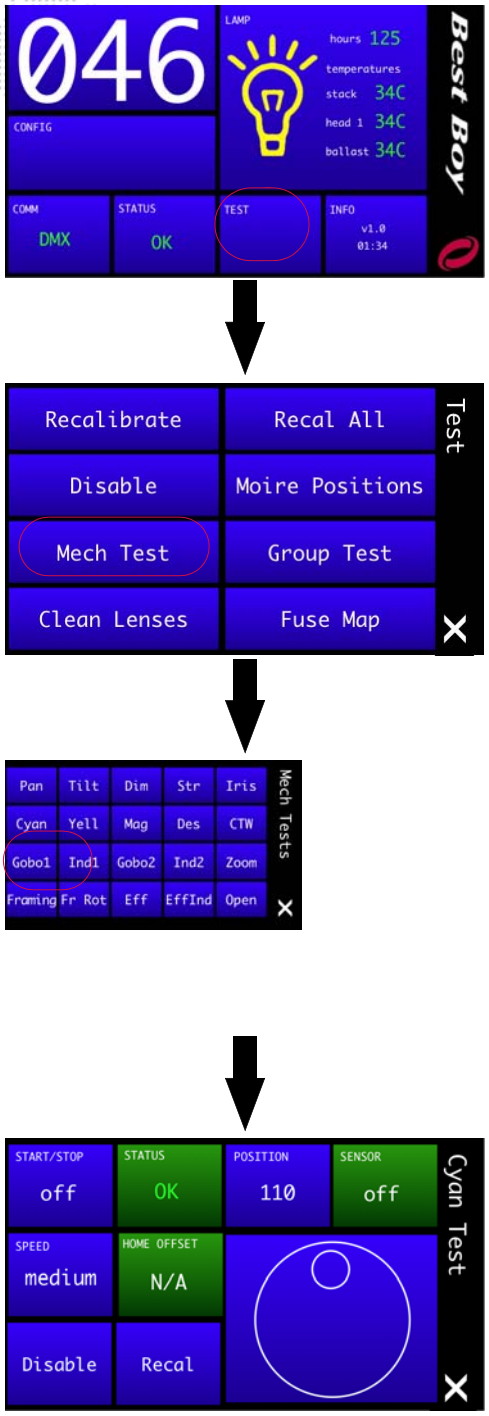
Mechanical Tests

The Mechanical Tests menu provides a method for exercising all luminaire mechanisms individually. Each mechanism has a similar Test screen. Cyan is shown in the example to the right.

The following test functions are available:

+ **Test Chase** - The mechanism will move back and forth between two positions. The START/STOP button starts and stops the motion, and the SPEED button sets the rate of the motion. For mechanisms with sensors, one of the positions will be on the sensor and the other position will be off.
+ **Manual Control** - The slider on the right side of the screen moves the mechanism through its range of travel, manually. Tapping the arrows will move the mechanism in half panel increments.
+ **Feedback** -The current status of the mechanisms encoder (POSITION) and sensor (SENSOR) are shown (if available for that mechanism). STATUS indicates whether the mechanism is in an error state or normal operating state.
+ **Utility Functions** - Press **Recal** to recalibrate the mechanism or **Disable** to turn off the motor control to allow the mechanism to move freely.
+ **Configuration Information** - HOME OFFSET indicates whether the home position* has been adjusted to fine tune sensor positions (applies to gobo wheel only; refer to Control Channel settings in "DMX Channel Mapping" on page 37).

* Due to small variations in sensor and sensor board positions, the open position on a gobo wheel might not be precisely aligned with the optical axis, creating a slight blockage on one side of the open beam. Adjust the wheel position via DMX to get the proper alignment and send the HOME OFFSET command to store the current position as the new "home" position. This position is stored in persistent memory and will be used going forward as the home position.



Group Tests

The Group Test menu allows multiple Best Boy 4000 Luminaires to be run through a configurable test sequence when chained together via DMX512 or Ethernet. (Refer to "Connecting Power and Data" on page 21 for more information about daisy-chaining.)

To perform a group test:

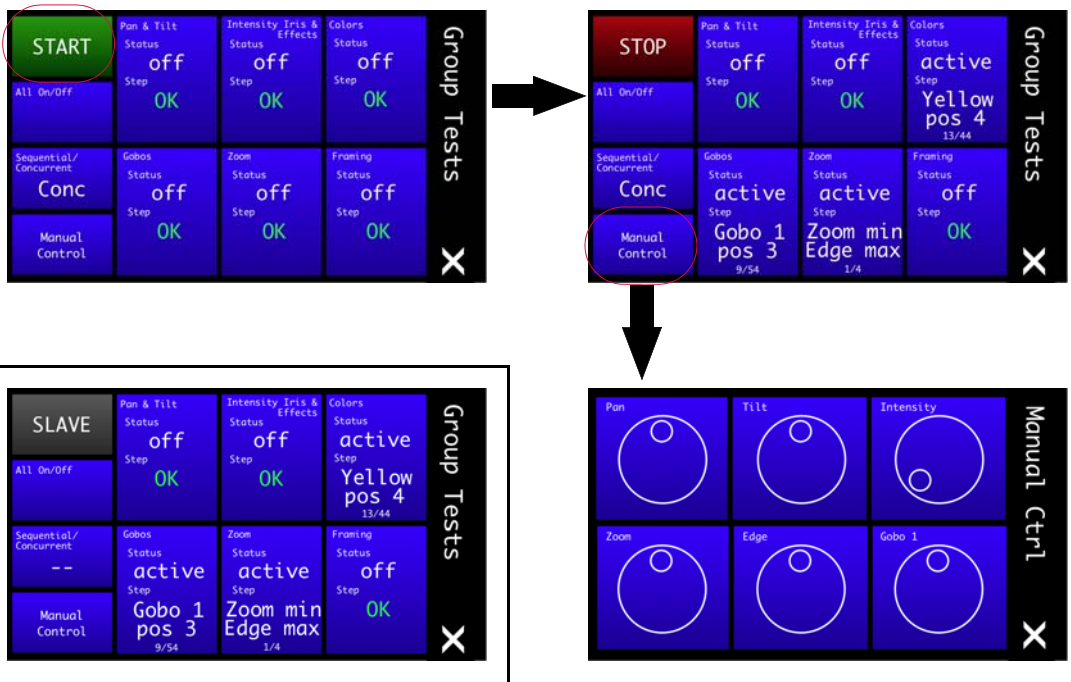
Step 1. At Group Test screen, select options to run: Pan/Tilt, Intensity, Colors, Gobos, Zoom, and/or Framing.

Step 2. Select test option: Concurrently (all selected tests are run at once) or Sequentially (tests are run one at a time as each one finishes).

Step 3. Press START to begin testing. All luminaires connected to the main fixture (now referred to as the "Master") will become "Slaves" and follow the test routine set on the Master in an endless loop.

Step 4. To stop the test sequence, press STOP on the Master.

While in group test, a Master can manually change certain values by using the Manual Control screen. From here, you can adjust the levels of parameters not active in the test sequence. For example, if a test were running on gobos and colors, you can adjust the pan and tilt to point the Master and all Slaves to a position where it will be easier see the output of the fixtures.



Slave fixtures will display "SLAVE" in the Group Tests screen as shown.

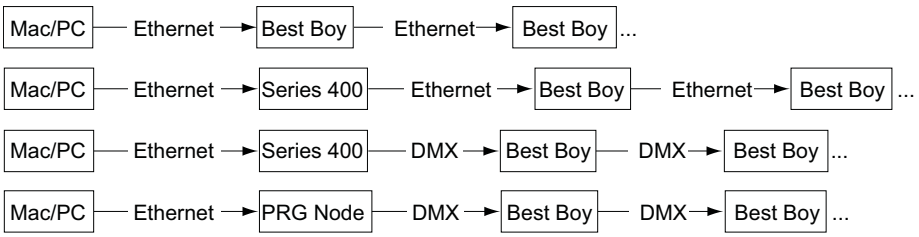
SOFTWARE UPDATE

Software Update Using LumLoader Application

Introduction

The LumLoader application allows you to update the software in a Best Boy 4000 Luminaire. The update will be sent over an Ethernet connection. The luminaire can take the Ethernet input directly, or the update can be translated to DMX512 signal with an appropriate device, either Series 400® or a Virtuoso® Node (with the required software update). The fixtures can be daisy-chained to load multiple fixtures at once.

Supported configurations:



Note: There should be no active control (DMX512 or Art-Net) during the update process.

Preparation - Java

The loader (LumLoader) is a Java application which can be run on a Mac or a PC computer.

Note: Microsoft Windows® and new Mac computers do not come with the required Java run-time library installed, so you may need to go to the Sun website (java.com/getjava/) to download Java.

Selecting an Ethernet Interface

Connect the computer to the system, and start the LumLoader application. When the application starts, it will ask which active Ethernet port should be used. Select the appropriate port. You may be able to differentiate the ports by IP address, compared with your network setup. Typically the en0 is the first built-in Ethernet port, and other interfaces could include additional network ports or wireless adapters.

Selecting the Module

The loader can support multiple versions of software, so make sure the appropriate version is selected. The default version will typically be fine.

Download the Software

Press "Start Download" to initiate the update. You should see the luminaires immediately drop into the startup screen and erase flash, which takes about 30 seconds. Then the new module is sent out, the screen indicates "Loading", and when complete they will go back to the main menu and start calibration.

If the fixture already has the update software version, it will not complete the update.

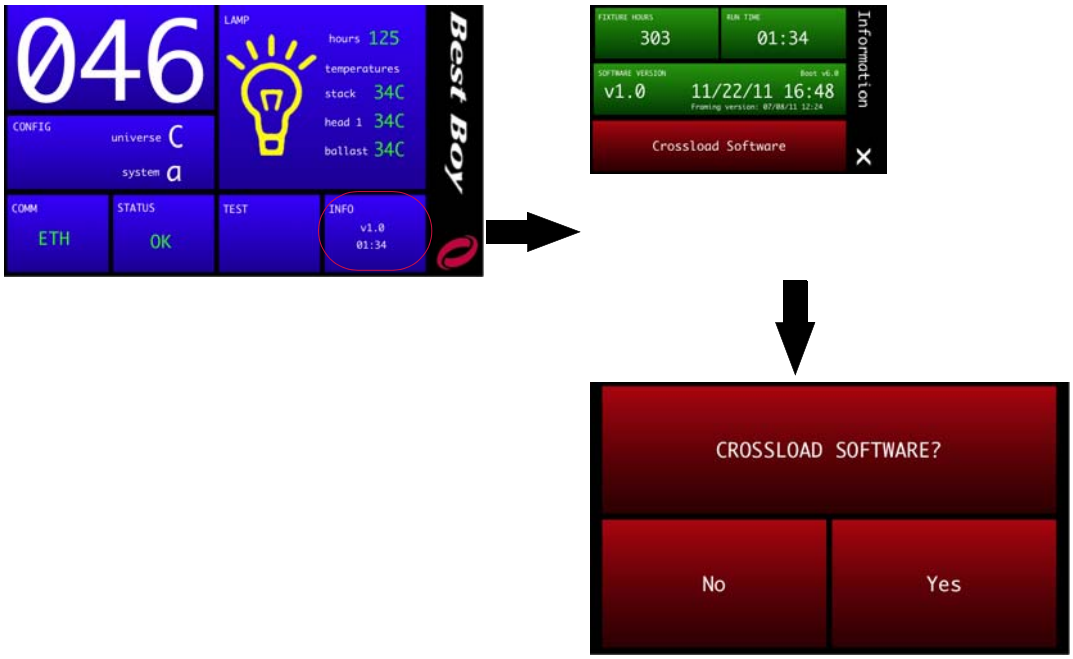
Troubleshooting

+ If the LumLoader application does not start up, make sure the Java library is installed.
+ Make sure the network port is active before starting the application. Sometimes it takes several seconds for the operating system to recognize the network link.
+ Make sure there is only one instance of the LumLoader application running.
+ Wireless should be disabled on the computer.

Software Crossload

The Information menu provides a method for sending a luminaire's current software version to all connected luminaires. (Luminaires can be daisy-chained via DMX512 or Ethernet.)

To initiate the software crossload, press **Crossload Software** at the Information screen. At confirmation screen, press "Yes." If a connected luminaire already has that software version, it will do nothing. If it does not have the same version, it will go into the boot screen and start updating.



Note: There should be no active control (DMX512 or Art-Net) during the update process.

EQUIPMENT HANDLING

Proper Lamp Servicing and Operation

Servicing

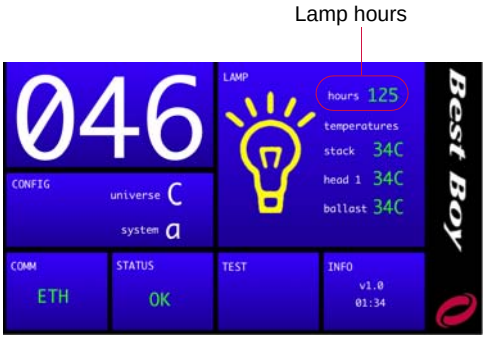
+ When handling a lamp, hold it by the ceramic base while wearing cotton gloves or finger cots. Do not touch the glass envelope (bulb). If you touch the glass with bare fingers, wipe off any fingerprints with alcohol.

Heat

+ When lamps are lit, the interior of the luminaires becomes very hot. To aid in the airflow circulation within the luminaires, after dousing the lamps, wait 5 minutes before removing power to the luminaires. This will provide enough time for the equipment fan to cool off the unit.

Lamp Life

+ When operating arc lamps, allow luminaires to operate for at least 3 minutes. It takes about 3 minutes for the fill components (mercury and halogen-metal compounds) in the lamp tubes to vaporize completely. If the lamps are switched off earlier than 3 minutes, the fill components are partially vaporized. The inadequately vaporized fill components and the electrode material (tungsten) are deposited in the areas of the lamp tubes that have remained cool. As a result, the lamp tubes blacken prematurely and reduce the service lives of the lamps.
+ If system will be unattended for more than 3-4 hours, luminaire lamps should be doused.
+ The lamp indicator (available on the menu Home screen) displays total lamp hours. Lamp hours are shown in green if under threshold, yellow at 650 hours, and red at 750 hours. *It is mandatory that the lamp be changed before 750 hours.*



CAUTION: It is mandatory that the lamp be changed before 750 hours.

ROUTINE MAINTENANCE

Replacing the Lamp

Parts:

71.2528.0700 / 2.3749A-02 1 EA LAMP, 700 W SHORT ARC, PHILIPS MSR700SA

Tools:

Cotton gloves or finger cots
Alcohol wipe (supplied with new lamp)

WARNING: Remove power from luminaire before performing any maintenance procedures.

CAUTION: Refer to "Proper Lamp Servicing and Operation" on page 62 before handling the lamp.

CAUTION: Wear cotton gloves or finger cots while servicing lamp. Touching the lamp glass with bare fingers will leave oil and cause the lamp to explode or burn out early. Clean with alcohol wipe after installing.

To replace lamp:

Step 1. Remove power from lamp and allow lamp to cool for at least 5 minutes.

Step 2. Remove power from luminaire.

Step 3. At rear lamp access door, push down on latch to open door. Refer to **Figure 4-2** on next page.

Step 4. In an alternating fashion, turn two thumbscrews counter-clockwise until lamp socket is loose. *Do not completely loosen one thumbscrew and then loosen the other. Loosen each one a little at a time in an alternating fashion to avoid breaking the socket or lamp.*

Step 5. Pull lamp socket straight out of luminaire.

Step 6. Remove lamp from socket.

Step 7. Install new lamp in socket, noting two different size pins. *Lamp will only fit in socket in one orientation.*

Step 8. Ensure lamp base is fully seated so that it touches contacts at four corners of socket.

Step 9. Using supplied alcohol wipe, carefully - but thoroughly - clean glass bulb.

Step 10. Align metal lamp wire with keyed hole at back of luminaire. Carefully re-install lamp socket without touching glass bulb with bare fingers. *If bulb is touched with bare fingers, it must be re-cleaned with alcohol.*

Step 11. Tighten two thumbscrews in an alternating fashion until fully secure.

Step 12. Close access door.

Step 13. Reset Lamp Hours. (Refer to "Lamp Screen" on page 33.)

Step 14. Optimize lamp. (Refer to "Adjusting the Lamp" on page 65.)

CAUTION: Wear cotton gloves or finger cots while servicing lamp. Touching the lamp glass with bare fingers will leave oil and cause the lamp to explode or burn out early. Clean with alcohol wipe after installing.

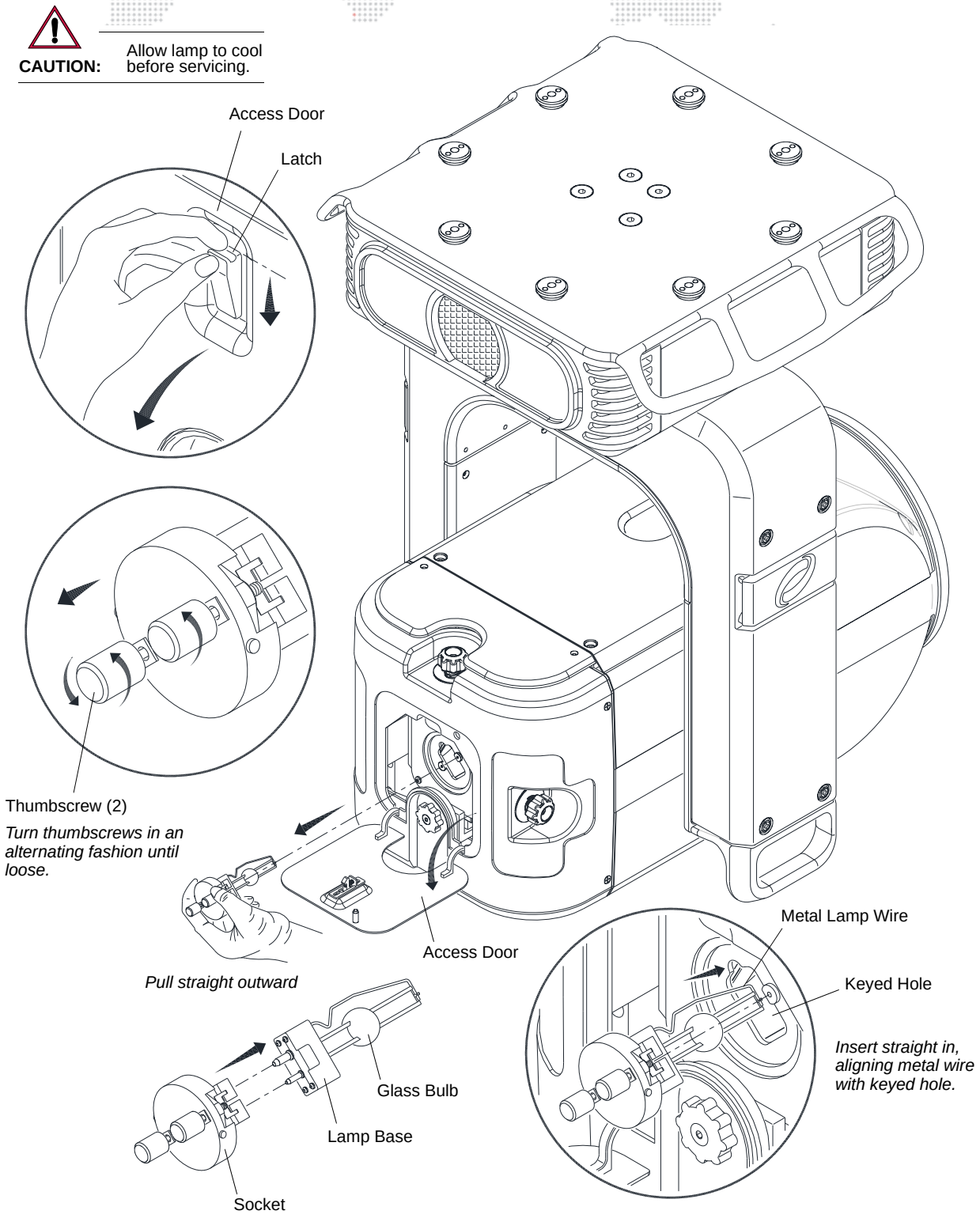


Figure 4-2: Replacing the Lamp

Adjusting the Lamp

After a new lamp is installed, it will be necessary to align the lamp in order to center and flatten the hot spot. Knobs located at the luminaire's backcap allow for adjustment.

Tools:
none

WARNING: Backcap may be HOT during lamp operation.

To adjust lamp:

Step 1. Power up luminaire and allow to warm up for at least ten minutes.

Step 2. Set intensity to 100%.

Step 3. Position beam on a white wall at a distance of 10' to 20'.

Step 4. Using control console, set beam size iris to 85%, set zoom for mid-range, and adjust for hard edge.

Step 5. Open iris without adjusting edge or zoom.

Step 6. At backcap, using horizontal (X) and vertical (Y) knobs, adjust hot spot to center of beam (**Figure 4-3**).

Step 7. Using focus (Z) knob, adjust beam to flatten hot spot.

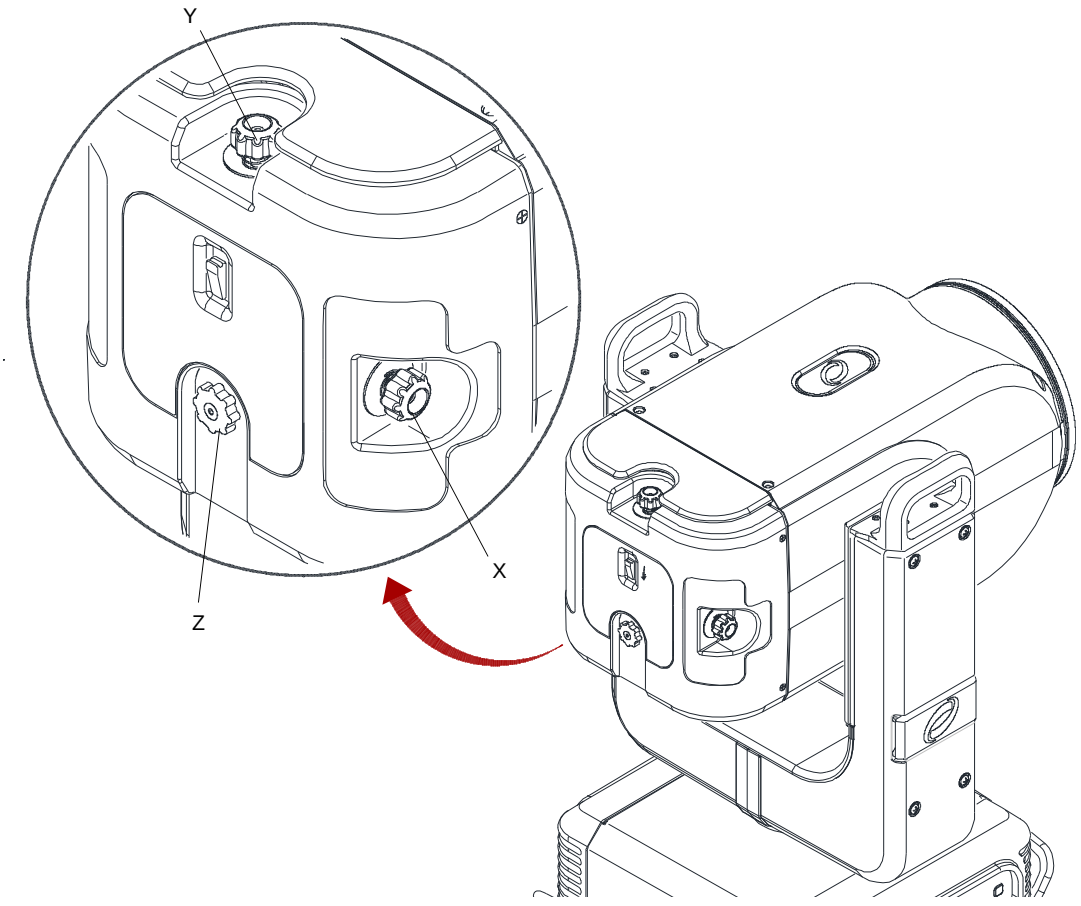


Figure 4-3: Adjusting the Lamp

Note: Be sure to reset Lamp Hours when installing a new lamp.

Removing Head Covers

To access some interior head components, one or both of the Head Covers may need to be removed.

A label on the backcap indicates which wheel components the head cover provides access to.

Parts:

21.9816.0630 2 EA ASSY, HEAD COVER

Tools:

#2 Philips screwdriver

To remove Head Covers:

Step 1. At cover, loosen four captive screws (**Figure 4-4**). (Cover will still be secured by a safety lanyard.)

Step 2. Unclip lanyard to completely remove cover.

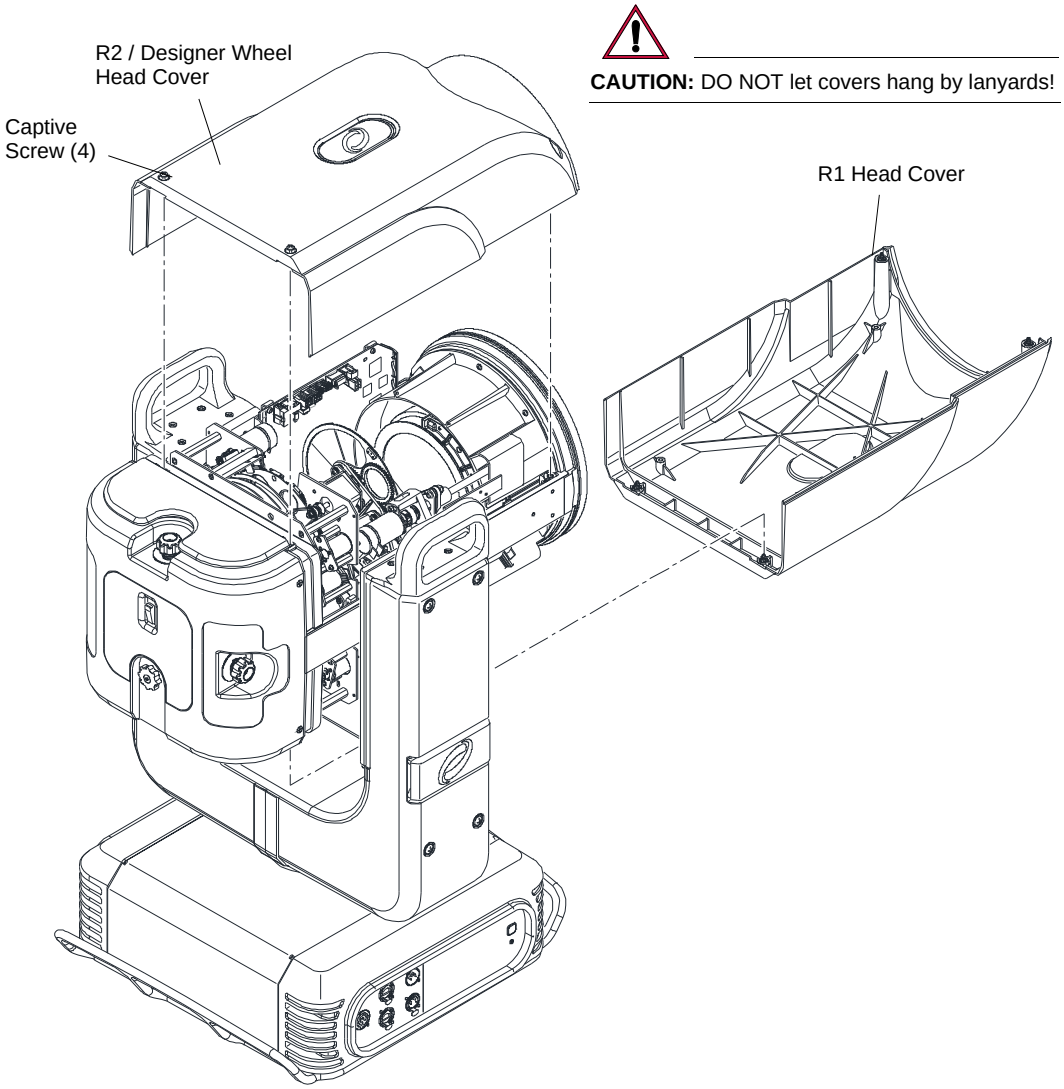


Figure 4-4: Removing Head Covers

Step 3. Replace covers as follows:

a. Attach lanyard clip.

b. Fit cover in place.

c. Tighten four captive screws.

Cleaning the Intake Filters

The filters should be cleaned or replaced when they become dirty. The frequency will depend on how often and in what conditions the luminaire is used.

Parts:

10.9816.0788	1 EA	YOKE FAN, AIR FILTER, FOAM
10.9816.0789	1 EA	YOKE FAN, AIR FILTER, ELECTROSTATIC

Tools:

#2 Phillips screwdriver
Compressed air *and/or* water

To clean or replace filters:

WARNING: Remove power from luminaire before performing any maintenance procedures.

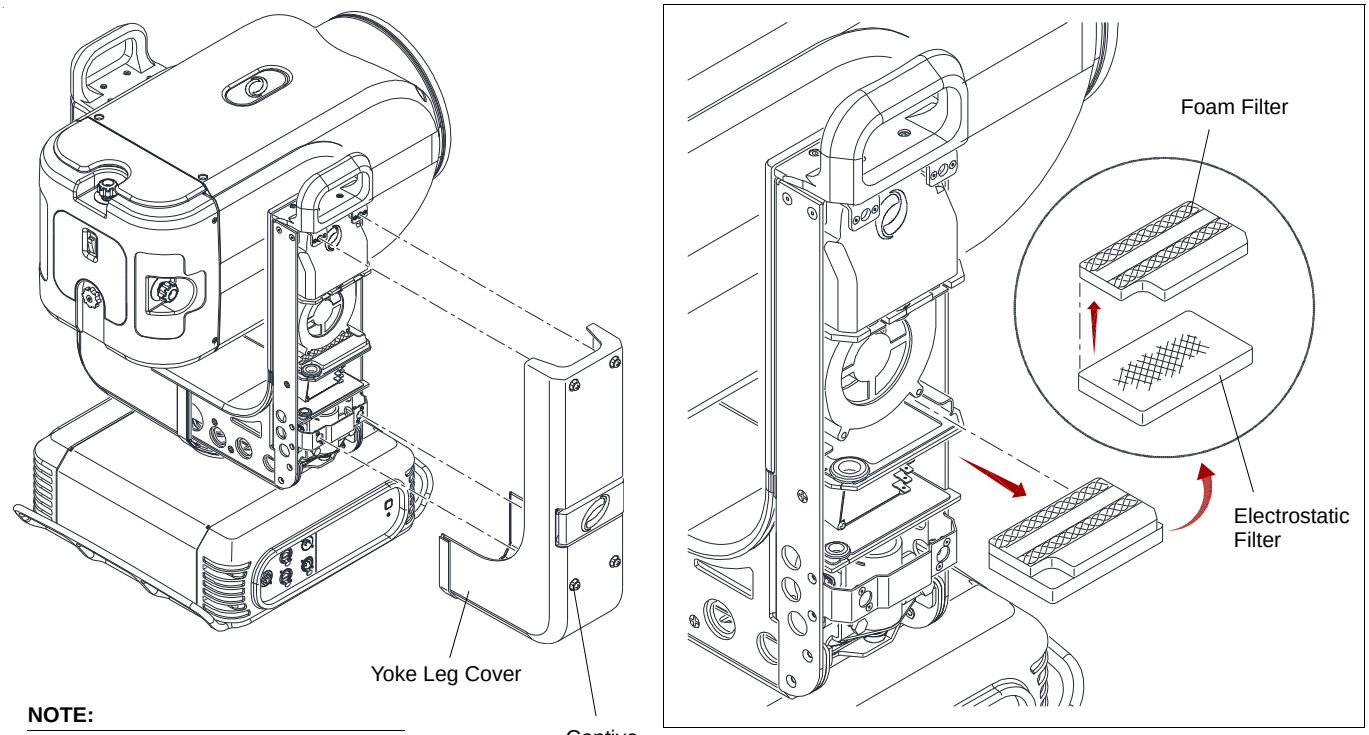
Step 1. Remove power from luminaire.

Step 2. Remove pan-side yoke leg cover by loosening four captive screws (**Figure 4-5**).

Step 3. Remove foam filter and electrostatic filter as one unit from yoke leg.

Step 4. Clean filters with compressed air and/or by washing with water. Replace as necessary.

Step 5. Re-install components.



NOTE:
If the filters do not get clean after multiple attempts, they should be replaced.

Figure 4-5: Removing Yoke Leg Cover and Air Filters

Cleaning the Luminaire Exterior

Tools:

Lint-free cloth
Window cleaner
Vacuum cleaner with brush nozzle or compressed air
#2 Phillips screwdriver

To clean luminaire:

WARNING: Remove power from luminaire before this procedure.

CAUTION: Use ONLY OptiMax™ Ultra Pure Cleaning Solution to clean optical components. DO NOT use Window Cleaner on lens!

Step 1. Remove power from luminaire.

Step 2. Using vacuum cleaner with brush nozzle or compressed air, clean dust from external components. *If using compressed air to clean out luminaire, DO NOT allow fans or blower to spin at high speeds, as this will damage their bearings.*

Step 3. Using window cleaner and a clean, lint-free cloth, wipe outside surface of luminaire. *DO NOT use window cleaner on lens!*

Cleaning the Lenses

Tools:

(2) Micro Fiber cloths (06.6085.0001.0)
OptiMax™ Ultra Pure Cleaning Solution (06.6084.0001.0)
Cotton gloves or finger cots
#2 Phillips screwdriver
3/16" flat screwdriver

To clean lenses:

CAUTION: Use caution when handling lenses. Avoid scratching optical surfaces.

CAUTION: Use ONLY OptiMax™ Ultra Pure Cleaning Solution to clean optical components. DO NOT use Window Cleaner on lenses! Wear cotton gloves or finger cots when handling lenses/glass.

Step 1. Apply power to luminaire and set intensity to 20%. (A beam will be necessary to see dirt and dust on the lenses.)

Step 2. Remove R2/Designer Head Cover to access Zoom Lens Assembly. (Refer to "Removing Head Covers" on page 66.)

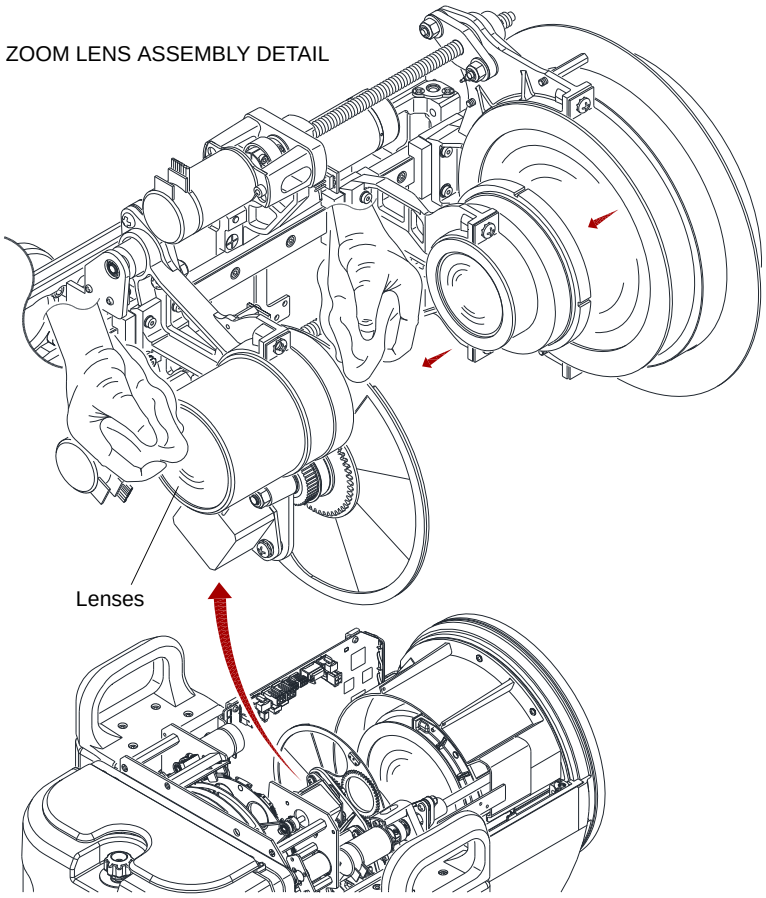
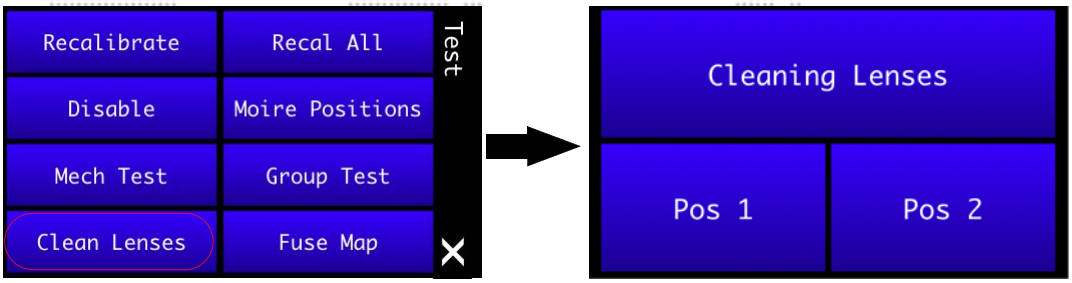


Figure 4-6: Accessing Zoom Lens Assembly

Step 3. At menu TEST screen, press "Clean Lenses." The Cleaning Lenses screen will open.

Step 4. Press "Pos1" to position lenses in first cleaning configuration.



CAUTION: When cleaning, do not allow the cleaning cloth to come into contact with the lens carrier rail. The rail has lubrication that will contaminate the cleaning cloth. Wear cotton gloves or finger cots.

Step 5. If lenses are only dusty, use Micro Fiber cloth to carefully wipe lens surfaces. If further cleaning is required, use OptiMax™ Ultra Pure Cleaning Solution and a Micro Fiber cloth to clean. *DO NOT use window cleaner!*

Step 6. At menu, press "Pos2" to position lenses in second cleaning configuration. (This will allow access to the remaining lens surfaces.)

Step 7. As in Step 5 above, clean remaining lens surfaces and front of luminaire Front Glass (**Figure 4-7**).

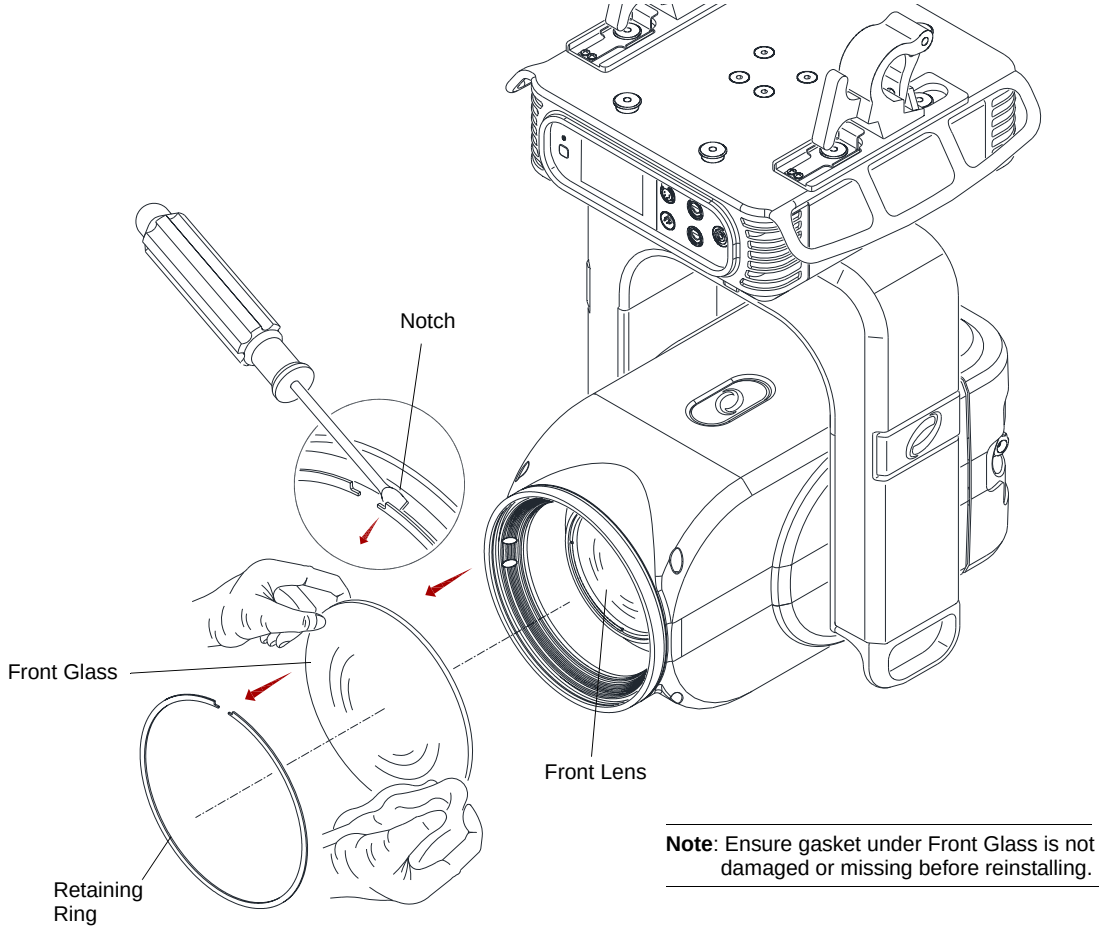

Notch
Front Glass
Front Lens
Retaining Ring
Note: Ensure gasket under Front Glass is not damaged or missing before reinstalling.

Figure 4-7: Removing Front Glass

CAUTION: Be extremely careful when removing Retaining Ring and Front Glass in next step. The glass can be easily chipped or cracked.

Step 8. To clean backside of Front Glass and front of Lens Group , remove Front Glass as follows:

a. Position luminaire head so that Front Glass is facing upward. (To prevent it from falling onto the floor when the Retaining Ring is removed in the next step.)

b. Insert flat screwdriver under notch in Front Lens Retaining Ring. Carefully remove Retaining Ring.

c. Remove Front Glass and place facedown on a Micro Fiber cloth.

d. Using OptiMax™ Ultra Pure Cleaning Solution and a Micro Fiber cloth, clean both sides of Front Glass and front of Lens Group. *DO NOT use window cleaner!*

e. Ensure gasket under Front Glass is not damaged or missing.

f. Re-install Front Glass.

CAUTION: "Done" MUST BE pressed at the menu to complete the procedure. If the lens motors are left in the cleaning configuration for too long, they may be damaged due to overheating.

Step 9. At menu, press "Done." This will free the motors and recalibrate the lenses.

Step 10. Replace Head Cover.

Cleaning Gobo, Color, and Effect Wheels

Tools:

Micro Fiber cloth (06.6085.0001.0)
OptiMax™ Ultra Pure Cleaning Solution (06.6084.0001.0)
Cotton gloves or finger cots
#2 Phillips screwdriver

To clean gobo, color and effect wheels:

CAUTION: Use ONLY OptiMax™ Ultra Pure Cleaning Solution to clean optical components. DO NOT use Window Cleaner on gobo, color, or dimmer wheels! Wear cotton gloves or finger cots when handling optical components.

CAUTION: The optical components are very fragile, use extreme caution when cleaning! Color gobos have thin layers applied to one side that can be damaged if cleaned too roughly. Use caution.

WARNING: Remove power from luminaire before this procedure.

Step 1. Remove power from luminaire.

Step 2. Remove Head Covers. (Refer to "Removing Head Covers" on page 66.)

Step 3. To clean Gobos:

a. Remove all gobos. (Refer to "Replacing a Gobo in Gobo Wheel 1" on page 73.)

b. Using OptiMax™ Ultra Pure Cleaning Solution and a Micro Fiber cloth, carefully clean gobos. *DO NOT use window cleaner!*

Step 4. To clean Designer Wheel:

a. Remove each filter. (Refer to "Replacing a Designer Color Filter" on page 77.)

b. Using OptiMax™ Ultra Pure Cleaning Solution and a Micro Fiber cloth, carefully clean filters. *DO NOT use window cleaner!*

Step 5. To clean Color Wheels:

a. Using OptiMax™ Ultra Pure Cleaning Solution and a Micro Fiber cloth, carefully clean color wheels. *DO NOT use window cleaner!*

b. Rotate wheels to access all surfaces.

Step 6. To clean Effect Wheel:

a. Using OptiMax™ Ultra Pure Cleaning Solution and a Micro Fiber cloth, carefully clean Effect Wheel. *DO NOT use window cleaner!*

b. Rotate wheel to access all surfaces.

Step 7. Replace Head Covers.

Replacing a Gobo in Gobo Wheel 1

Due to the complex gear alignment, it is best to remove ALL gobos from the wheel even when replacing or swapping only one gobo. This way all gobos can be re-installed at one time with the proper alignment. Recalibrating a single gobo can be a difficult process.

Parts:

Standard or Custom Gobo(s), as required. (Refer to "Gobo Wheel Standard Configurations" on page 8.)

Tools:

#2 Phillips screwdriver
Cotton gloves or finger cots

WARNING: Remove power from luminaire before performing any maintenance procedures.

To replace a gobo:

Step 1. Remove power from luminaire.

Step 2. Remove R1 Head Cover. (Refer to "Removing Head Covers" on page 66.)

CAUTION: Do not touch gobos with bare fingers. Wear cotton gloves or finger cots when handling.

Step 3. Using fingers, grasp frame of each gobo and pull out of wheel (**Figure 4-8**). Remove ALL gobos.

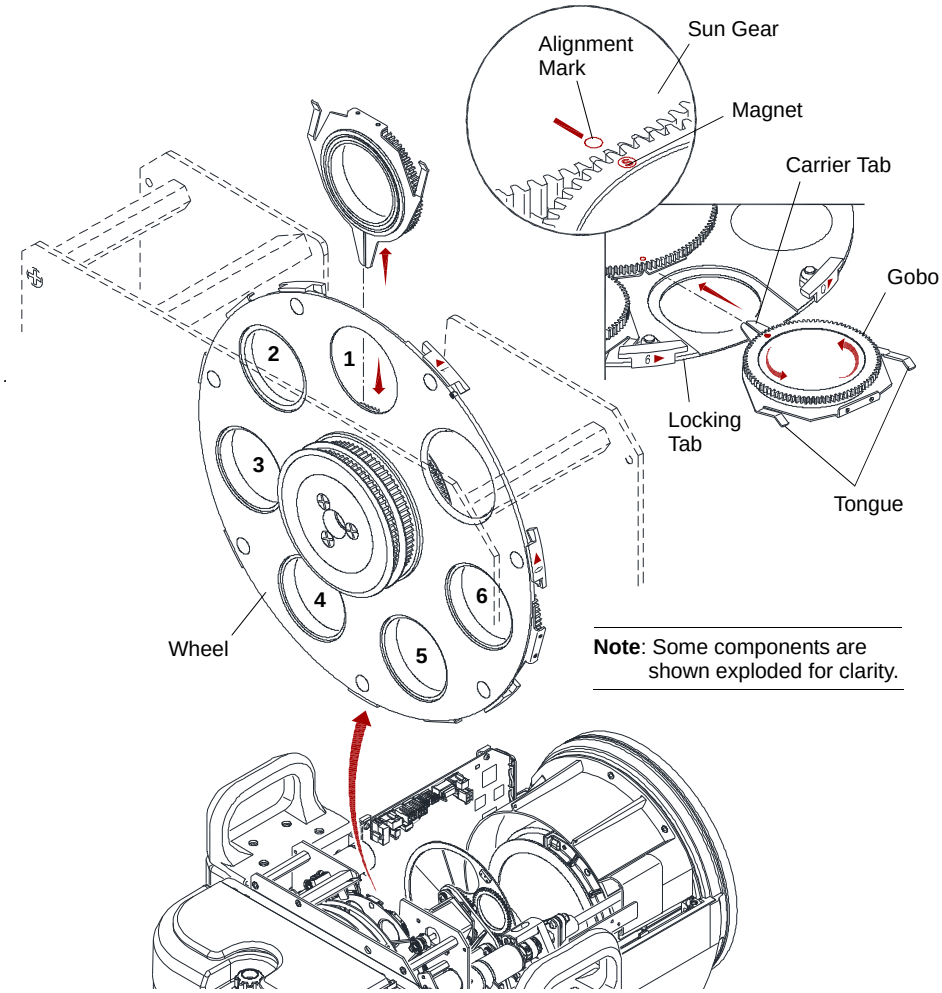


Figure 4-8: Replacing a Gobo (Wheel 1)

Step 4. Re-install all gobos (making changes as necessary) by doing the following:

a. Rotate gobo wheel so that first position is accessible. Refer to **Figure 4-9** for wheel positions.

b. Align gobo's magnet with alignment mark on sun gear as shown in **Figure 4-8**.

c. Carefully insert gobo, ensuring that carrier tab goes under retaining plate (under sun gear). Press until tongue is secured by locking tab.

d. Rotate gobo wheel to next position and install next gobo in same manner. Repeat for remaining gobos.

Step 5. When finished, rotate gobo wheel as a visual test. When properly installed, the gobo magnet for each installed gobo should be positioned in the same approximate position as the gobo wheel is spun around. Adjust as necessary.

Step 6. Replace Head Cover.

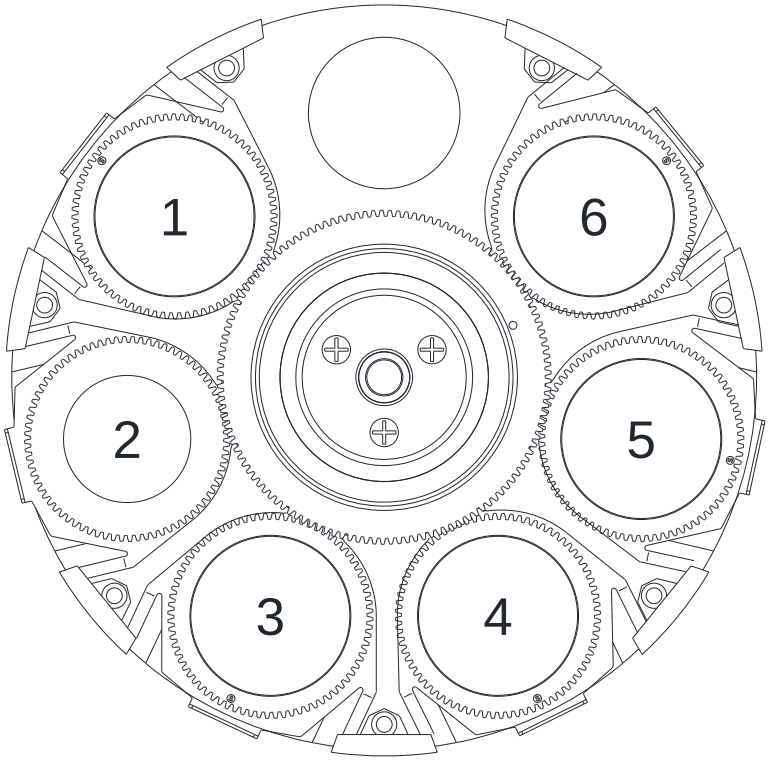


Figure 4-9: Gobo Wheel 1 Positions

Replacing a Gobo in Gobo Wheel 2

Due to the complex gear alignment, it is best to remove ALL gobos from the wheel even when replacing or swapping only one gobo. This way all gobos can be re-installed at one time with the proper alignment. Recalibrating a single gobo can be a difficult process.

Parts:

Standard or Custom Gobo(s), as required. (Refer to "Gobo Wheel Standard Configurations" on page 8.)

Tools:

#2 Phillips screwdriver
Cotton gloves or finger cots

WARNING: Remove power from luminaire before performing any maintenance procedures.

To replace a gobo:

Step 1. Remove power from luminaire.

Step 2. Remove R2/Designer Head Cover. (Refer to "Removing Head Covers" on page 66.)

CAUTION: Do not touch gobos with bare fingers. Wear cotton gloves or finger cots when handling.

Step 3. Using fingers, grasp frame of each gobo and pull out of wheel (**Figure 4-10**). Remove ALL gobos.

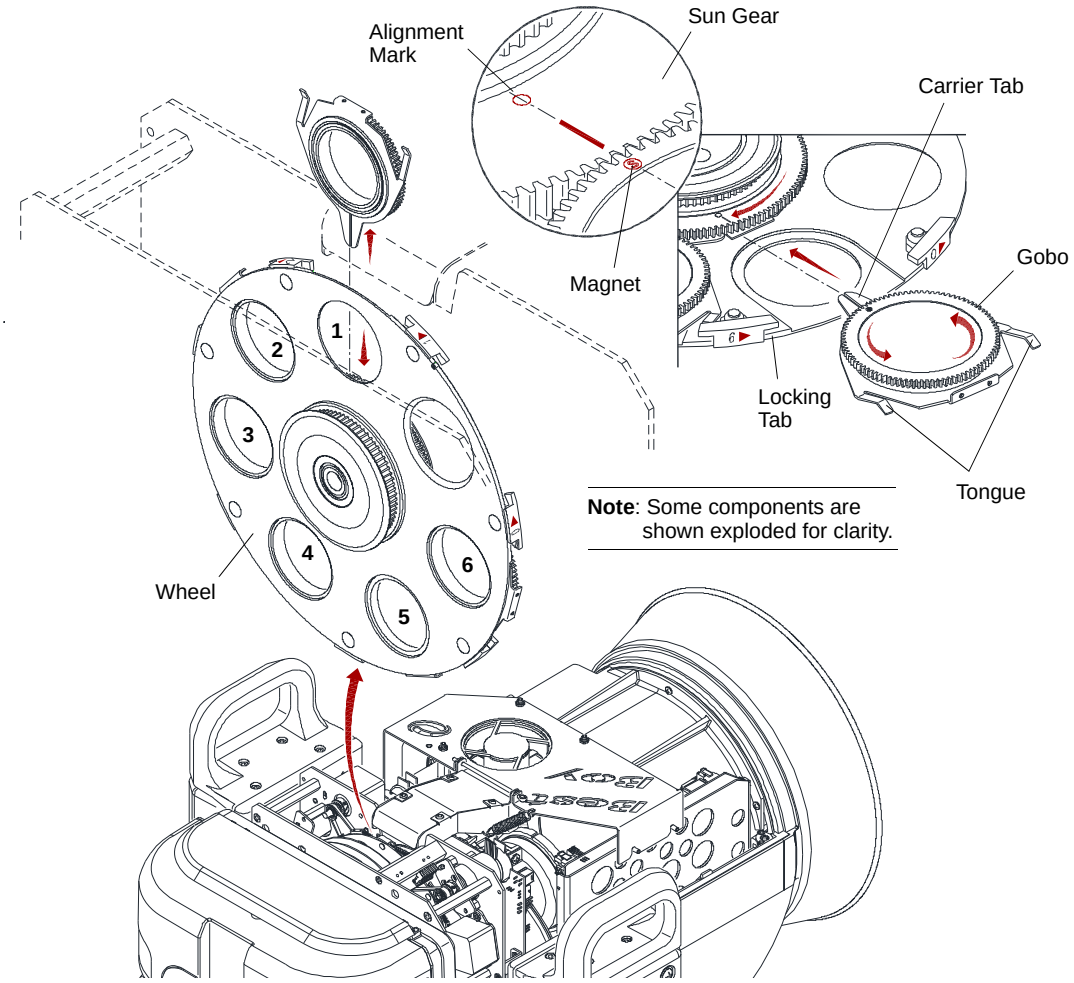


Figure 4-10: Replacing a Gobo (Wheel 2)

Step 4. Re-install all gobos (making changes as necessary) by doing the following:

a. Rotate gobo wheel so that first position is accessible. Refer to **Figure 4-11** for wheel positions.

b. Align gobo's magnet with alignment mark on sun gear as shown in **Figure 4-10**.

c. Carefully insert gobo, ensuring that carrier tab goes under retaining plate (under sun gear). Press until tongue is secured by locking tab.

d. Rotate gobo wheel to next position and install next gobo in same manner. Repeat for remaining gobos.

Step 5. When finished, rotate gobo wheel as a visual test. When properly installed, the gobo magnet for each installed gobo should be positioned in the same approximate position as the gobo wheel is spun around. Adjust as necessary.

Step 6. Replace Head Cover.

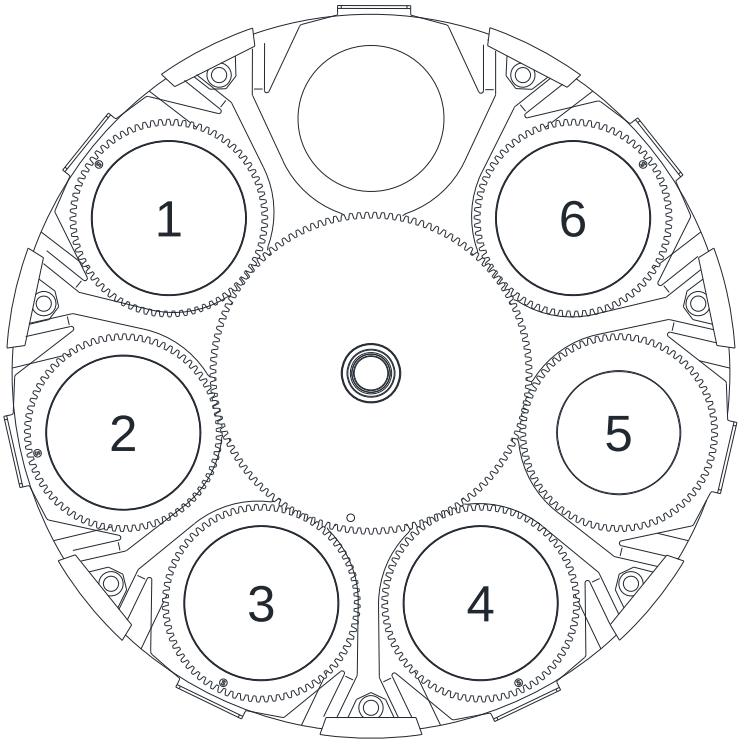


Figure 4-11: Gobo Wheel 2 Positions

Replacing a Designer Color Filter

Parts:

Designer Color Filter(s), as required. (Refer to "Designer Color Wheel Standard Configuration" on page 7.)

Tools:

#2 Phillips screwdriver
Cotton gloves or finger cots

WARNING: Remove power from luminaire before performing any maintenance procedures.

To replace a designer color filter:

Step 1. Remove power from luminaire.

Step 2. Remove R2/Designer Head Cover. (Refer to "Removing Head Covers" on page 66.)

CAUTION: Do not touch color filters with bare fingers. Wear cotton gloves or finger cots when handling.

Step 3. Rotate wheel until desired designer color filter is accessible (**Figure 4-12**).

Step 4. Using fingers, grasp frame of color filter and pull straight out of wheel hub.

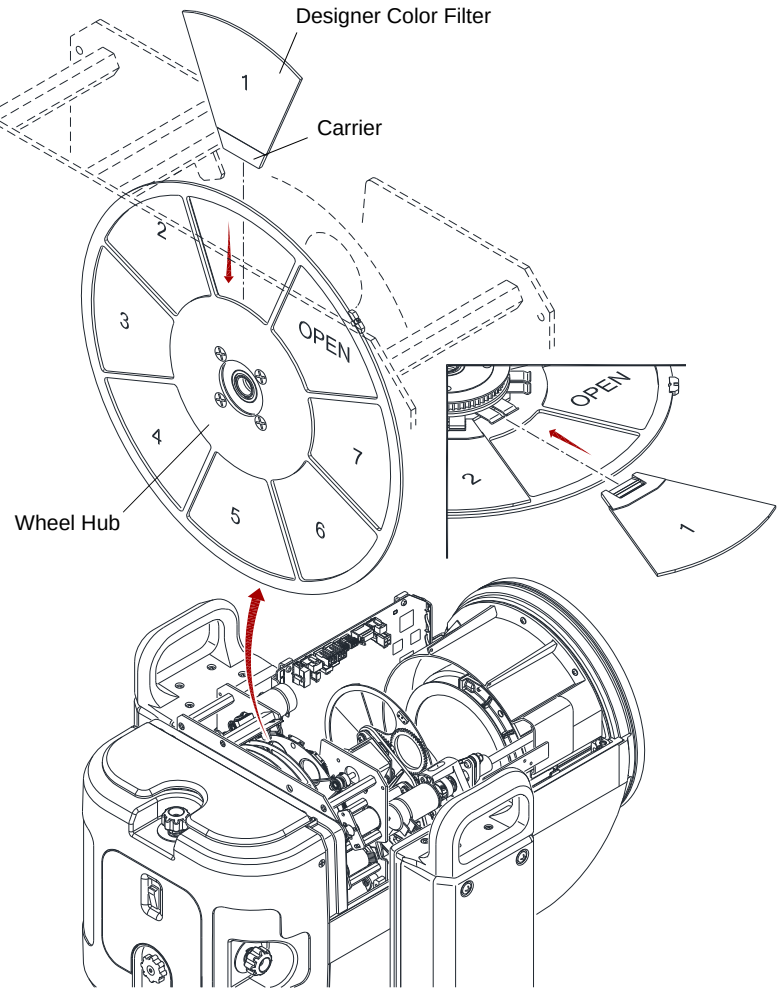


Figure 4-12: Removing a Designer Color Filter

Step 5. Noting proper orientation of carrier, insert new designer color filter into position and push until carrier clicks into place. Refer to **Figure 4-13** for wheel positions.

Step 6. Replace Head Cover.

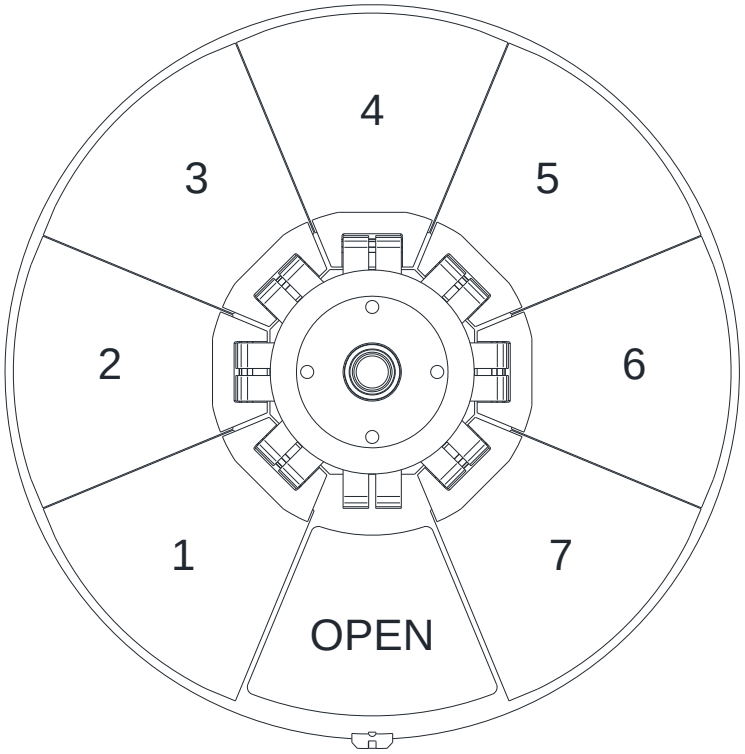


Figure 4-13: Designer Color Wheel Positions

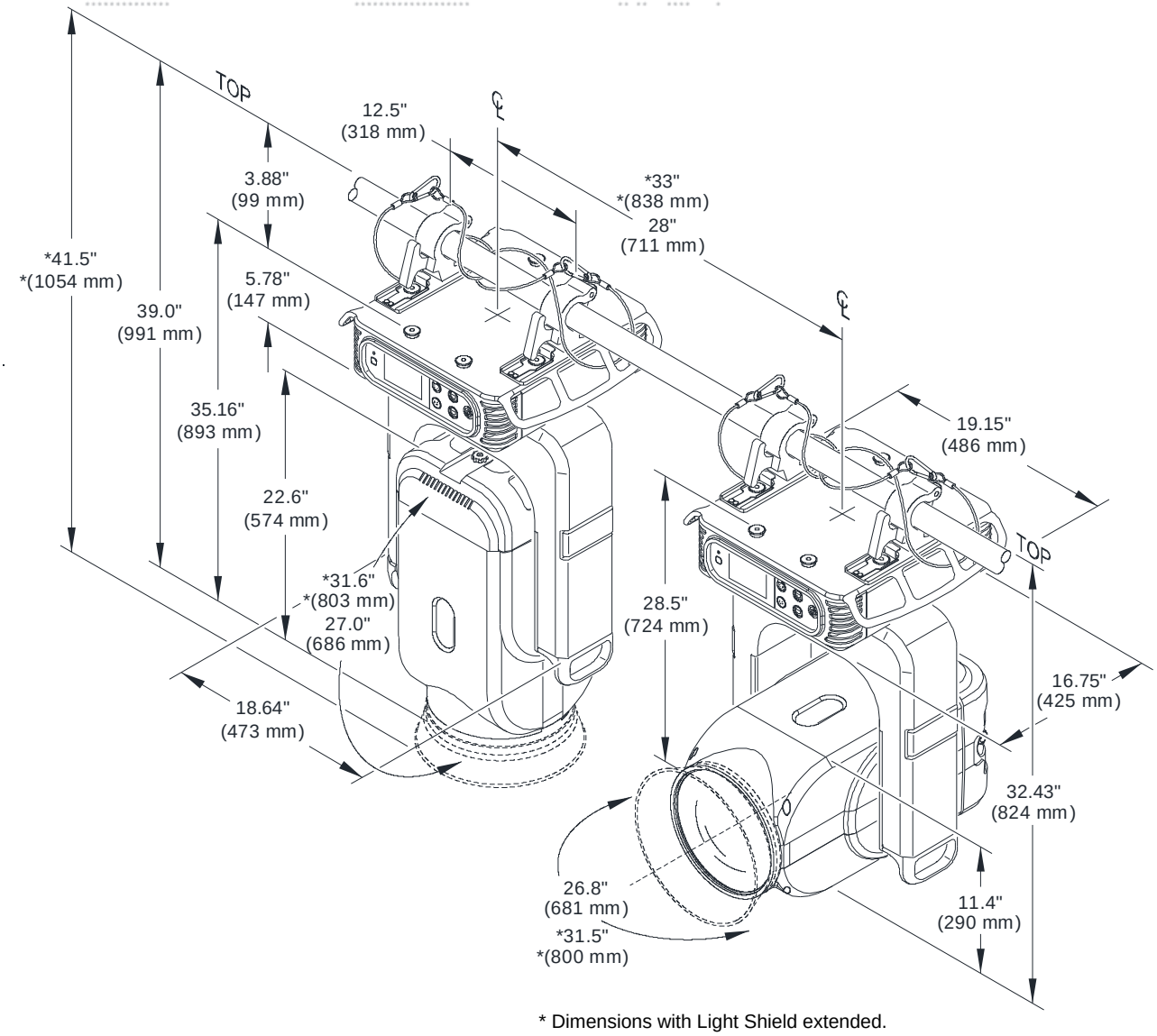
A.

TECHNICAL SPECIFICATIONS

+ BEST BOY 4000 SPOT LUMINAIRE
+ BEST BOY ROAD CASE
+ PHOTOMETRIC DATA

Best Boy 4000 Spot Luminaire

SOURCE:	MSR 700SA lamp
OUTPUT:	20,000 lumens
INPUT CURRENT:	Minimum 90V, Maximum 270V. 12.0A @ 90V, 10.6A @ 100V, 9.7A @110V, 8.8A @ 120V, 5.8A @180V, 5.3A @ 200V, 5.0A @ 208V, 4.8A @ 220V, 4.4A @ 240V, 4.0A @ 270V Auto-sensing voltage input range is 90V-264V, 50/60Hz
OPTICAL EFFICIENCY:	31%
REFLECTOR:	Precision glass reflector with cold mirror coating.
ZOOM RANGE:	8:1 from a tight spot of 8° to a very wide flood of 64° maintaining focus throughout.
BEAM SIZE CONTROL:	In addition to the zoom optics, a mechanical iris provides continuous beam size control for both rapid changes and smooth, timed beam angle changes.
FRAMING:	Four-blade framing system featuring four independent blades mounted in two planes. Each blade can be tilted +/- 30° and the entire frame system can be rotated +/- 60° for a total travel of 120°.
DIMMING:	Gray-scale glass dimmer for full-field dimming from 0% to 100% with accurate slow-speed control and fast bumps.
STROBE:	Servo-powered, lightning fast strobe wheel.
EFFECTS:	One (1) multiplying four-facet prism, two (2) glass effects, and variable frost.
COLOR:	CMY color system featuring three (3) crossfading color wheels of Cyan, Magenta, and Yellow, plus one (1) designer wheel with seven (7) user-changeable color filters.
COLOR TEMP CONTROL:	Adjustable color temperature wheel, range from 3,000K all the way up to 7,500K. Includes an integrated minus green filter.
ROTATING GOBOS:	Two (2) indexable, rotating gobo wheels with six (6) gobos per wheel. Gobos are individually calibrated so the unit will automatically index the orientation of each gobo regardless of initial placement. Both gobo wheels accept PRG Moiré Gobos™ for advanced gobo rotator effects.
OPERATING TEMP:	-20° to 120°F (-29° to 49°C)
CONTROL:	Compatible with all PRG consoles and a wide variety of DMX512 and Art-Net consoles.
DMX CHANNELS:	45 DMX512 channels required per unit.
ETHERNET BYPASS:	A relay allows Ethernet signals to pass through daisy-chained luminaires even if power is removed.
ON-BOARD CONTROL:	Built-in LCD touchscreen display allows for on-board fixture control and feedback. On-board battery power allows for the fixture address and configurations to be set without having to apply AC power to the luminaire.
PAN & TILT:	Three-phase, high-speed servomotors. Brakes are applied when off.
RANGE:	Pan - 615°, Tilt - 260°
POSITIONING:	Can be mounted in any orientation.
SPACING:	Hangs on 33 inch (838 mm) centers when Light Shield is extended. Hangs on 28 inch (711 mm) centers when Light Shield is not extended.
WEIGHT:	109 lbs (49.44 kg) without hooks.

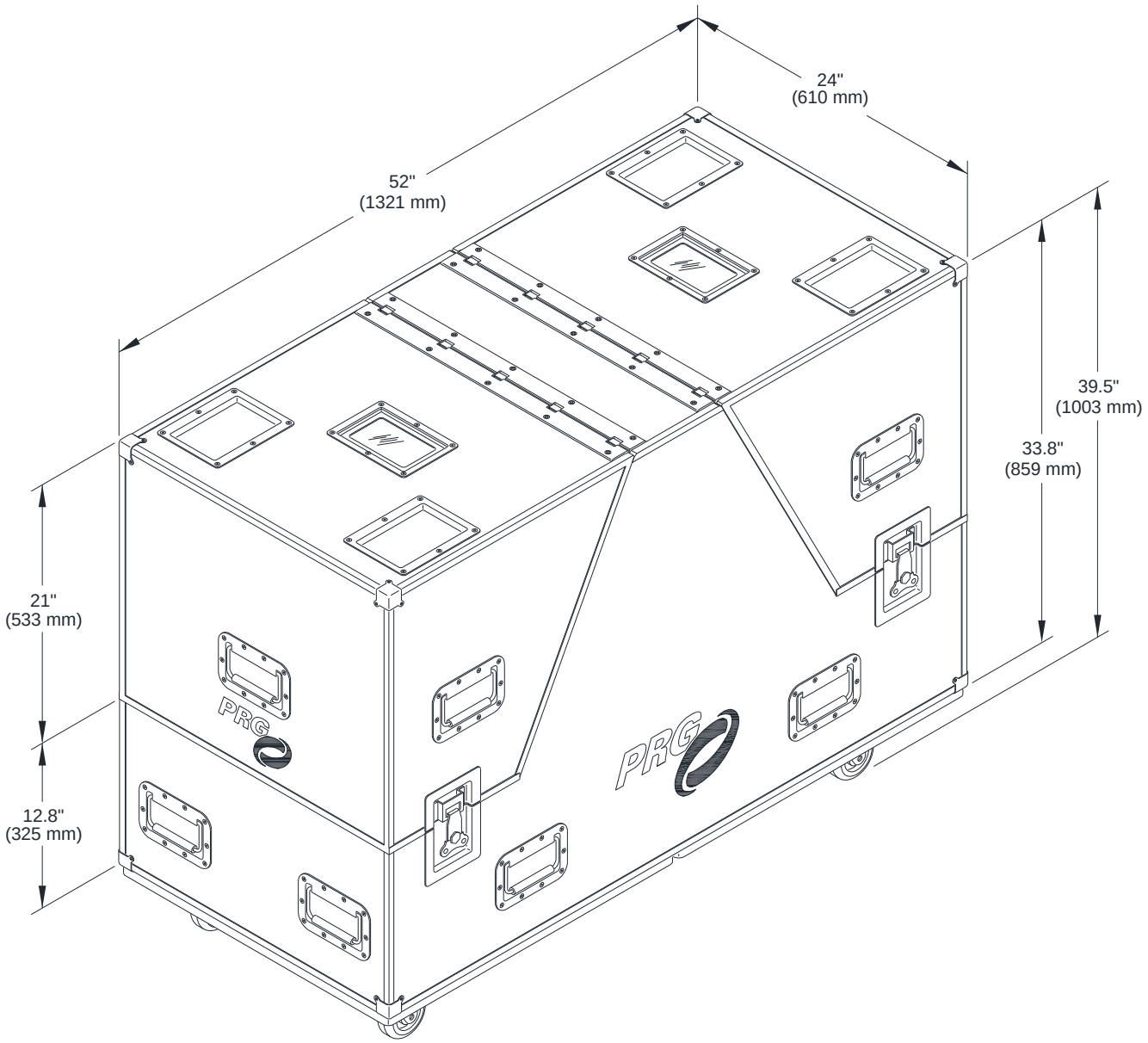


* Dimensions with Light Shield extended.

Best Boy Road Case

EMPTY WEIGHT: 171 lbs (77.56 kg)

LOADED WEIGHT: 389 lbs (176.45 kg)



Photometric Data

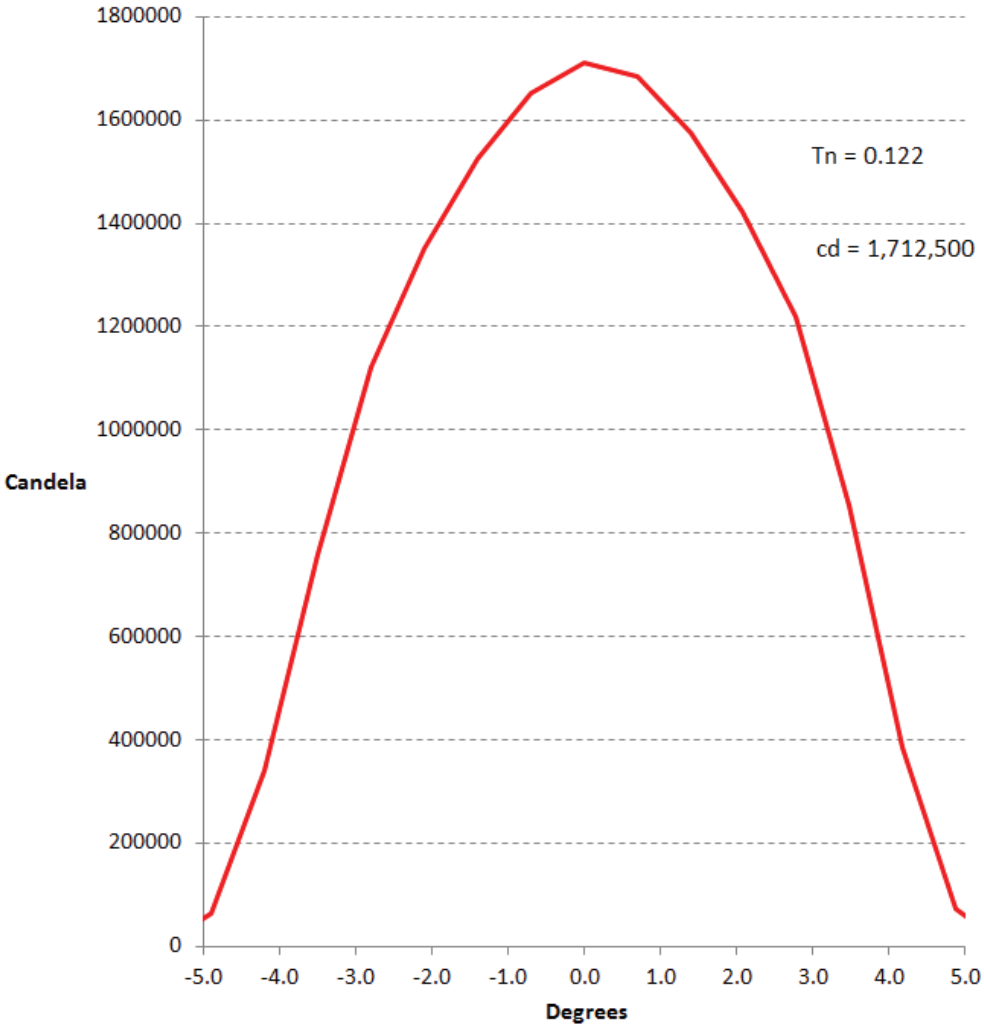
Narrow Field of View

Iris Full Open
9º Full Angle
19,100 Field Lumens

Throw Dist. (Ft)	20	30	50	75	100
Beam Dia. (Ft)	2.4	3.7	6.1	9.2	12.2
Illuminance (fc)	4281	1903	685	304	171
---	---	---	---	---	---
Throw Dist. (m)	5	10	20	25	30
Beam Dia. (m)	0.6	1.2	2.4	3.1	3.7
Illuminance (lux)	68500	17125	4281	2740	1903

Multiply throw distance by Tn to find beam diameter.

Divide cd (candela) by distance squared to find center beam illuminance.
Dist. in Ft. = foot candles
Dist. in meters = lux



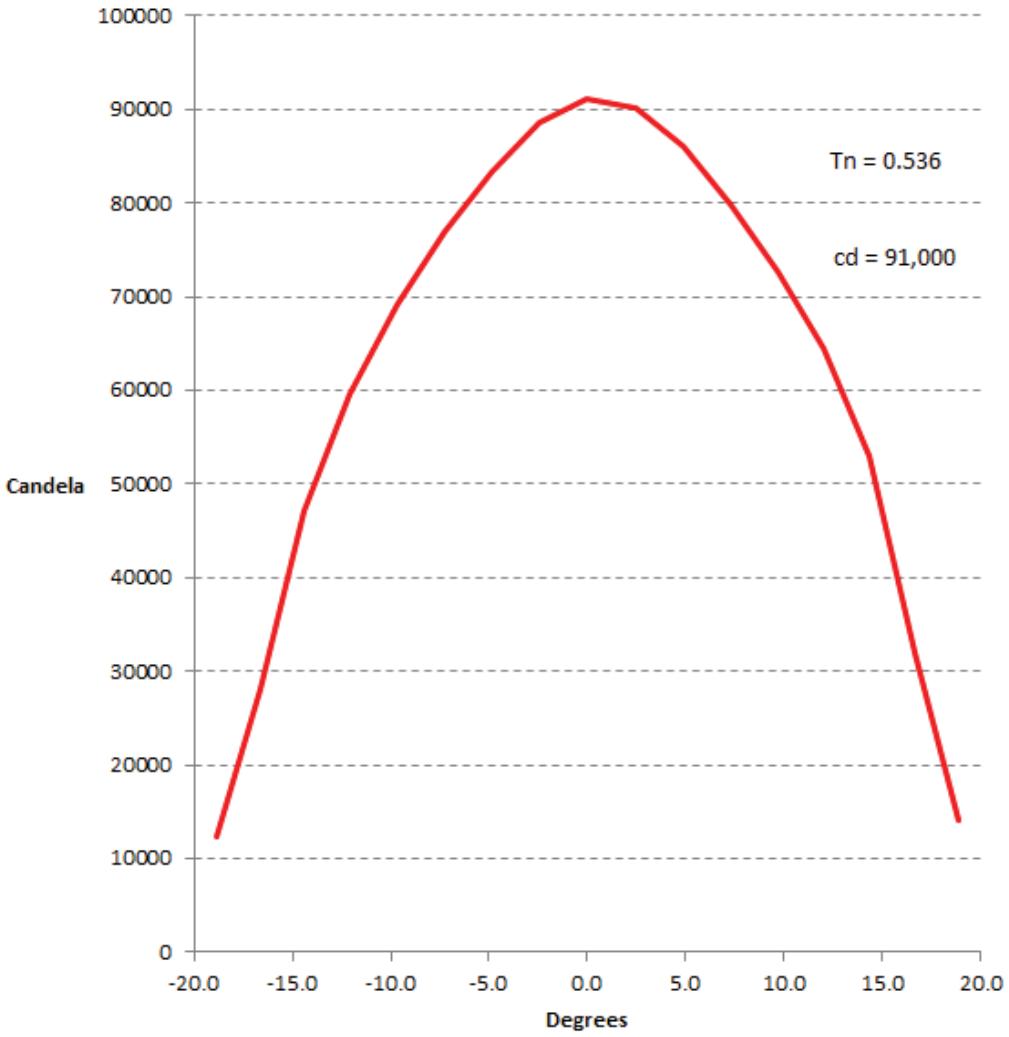
Medium Field of View

Iris Full Open
38º Full Angle
19,100 Field Lumens

Throw Dist. (Ft)	20	30	50	75	100
Beam Dia. (Ft)	10.7	16.1	26.8	40.2	53.6
Illuminance (fc)	228	101	36	16	9
---	---	---	---	---	---
Throw Dist. (m)	5	10	20	25	30
Beam Dia. (m)	2.7	5.4	10.7	13.4	16.1
Illuminance (lux)	3640	910	228	146	101

Multiply throw distance by Tn to find beam diameter.

Divide cd (candela) by distance squared to find center beam illuminance.
Dist. in Ft. = foot candles
Dist. in meters = lux



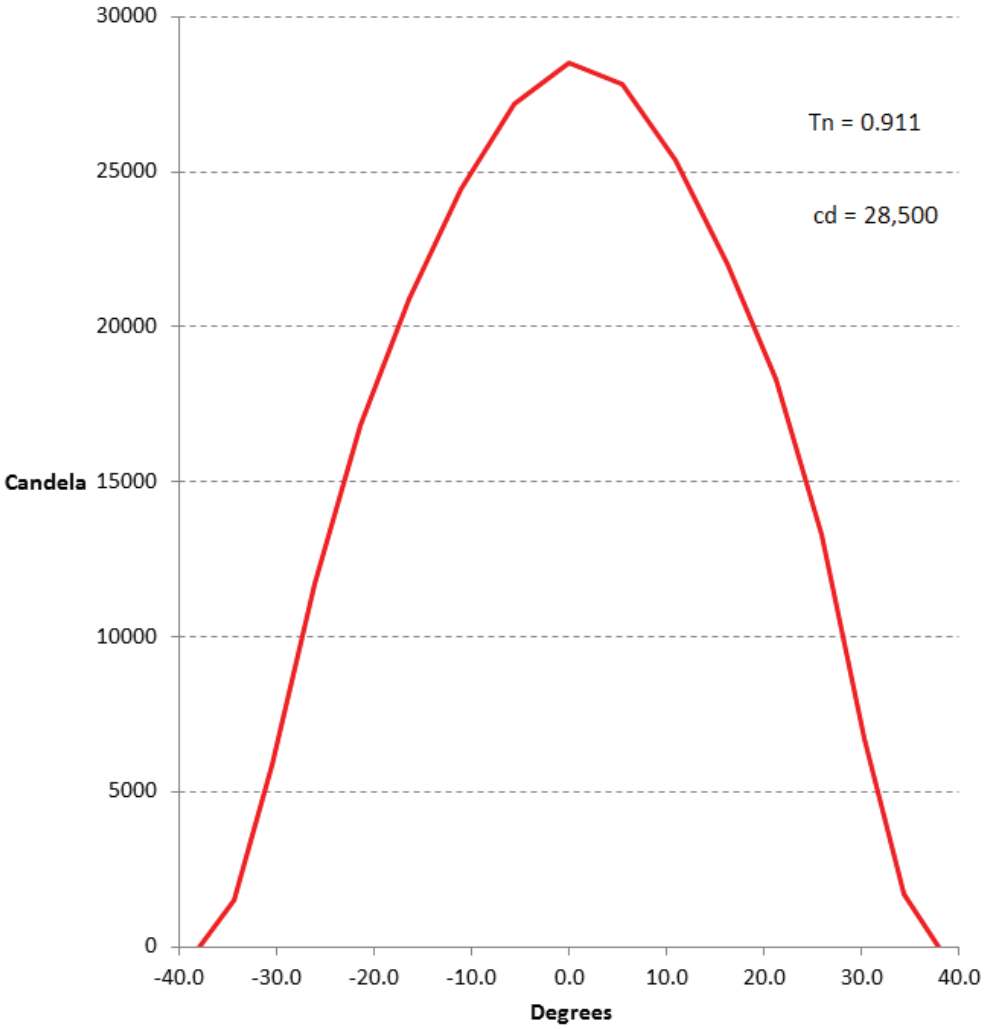
Wide Field of View

Iris Full Open
66º Full Angle
19,500 Field Lumens

Throw Dist. (Ft)	20	30	50	75	100
Beam Dia. (Ft)	18.2	27.3	45.6	68.3	91.1
Illuminance (fc)	71	32	11	5	3
---	---	---	---	---	---
Throw Dist. (m)	5	10	20	25	30
Beam Dia. (m)	4.6	9.1	18.2	22.8	27.3
Illuminance (lux)	1140	285	71	46	32

Multiply throw distance by Tn to find beam diameter.

Divide cd (candela) by distance squared to find center beam illuminance.
Dist. in Ft. = foot candles
Dist. in meters = lux



Notes

B.

GLOSSARY

This glossary provides useful terms associated with operating Best Boy 4000 Spot Luminaires.

Glossary of Terms

Address
A numerical "name" given to a device on a DMX512 line indicating which of 512 possible channels it will respond to.

Align (lamp)
The process of adjusting the lamp within the reflector to obtain the desired output quality of the beam.

Arc Lamp
A type of lamp which creates light by forming an arc of electricity. Brightness is achieved by including gasses and metals within the envelope of the lamp which dissolve and give off a bright light. Arc lamps must be dimmed mechanically because electrical dimming will extinguish the arc.

Art-Net
Protocol for sending DMX512 data over IP networks.

Attribute
An individual controllable aspect of a luminaire: pan, tilt, color, etc. Also known as "parameter."

Beam

1) The size, shape and sharpness of image of the light beam as projected on stage.
2) A function of the luminaire related to the size, shape, and sharpness of the light beam, specified by beam and edge data, and use of gobos (patterns) as required.

Blade

One of the four components of the Framing mechanism used to mask off certain areas of the beam's output.

Channel
A control reference which collects a device's associated thumbwheel address(es) (device, lamp power, etc.) and maps them to a single selectable number. Channels are assigned via the patch setup. (Also referred to as a "Control Channel.")

Console Timing
Time value in seconds or minutes applied to an entire cue.

CMY
Acronym for "Cyan, Magenta, and Yellow."

DMX512
Digital multiplexing; an industry standard protocol. 8-bit protocol with a maximum of 256 steps of resolution per channel. Maximum of 512 controllable channels per DMX data stream.

DMX512 Cable
Industry standard cable consists of two twisted pair and a shield, and 5-pin XLR style connectors.

The pin out is: pin 1 = common (shield), pin 2 = data -, pin 3 = data +.

The second pair (pins 4 & 5) may be used for a secondary data link.

DMX512 Universe
A group of up to 512 DMX channels. Consoles may have more than one universe, usually labeled in groups of 512.

Douse
To de-energize a luminaire lamp. (Douse is unrelated to intensity states.)

Ethernet
Networking technology used to connect local area networks (LANs) via CAT5 cable or wireless.

Fixture Orientation
Based on the direction the pigtail points as it exits the fixture.

Flipped Focus
When one or more fixtures inadvertently move differently from others in the system.

Focus
The point to which the light beam is directed. Also, a function of the luminaire related to the direction of the beam as specified by pan and/or tilt data.

Framing

A device/function of the luminaire which can be used to mask off certain areas of the beam's output.

Gobo
A removable piece of glass or metal which contains a pattern used to create backgrounds or textures when projected onto scenery or cycloramas. Gobos typically contain geometrical shapes or natural elements such as fire, stars, or leaves.

Gobo, Moiré

See *Moiré Gobo*.

Hard Reset
Restarts luminaires and reloads operating system and cue data.

Home Position
Pan and Tilt values at 50%. Also called "Zero Position" or a "50/50" cue or group.

Indexing
A function of a rotating gobo mechanism.

Intensity
A value placed on the relative brightness of a lighting fixture; 100% is considered "full," and 0% is considered "out."

Iris
A motor controlled mechanism which is used to adjust the beam diameter.

Lamp
Light source consisting of filament or electrodes, base, and envelope or "bulb."

Luminaire Calibration
The process of a luminaire finding its end stops for all parameters.

Macro

A pre-defined sequence that allows for quick and easy control of luminaire functions such as iris, zoom, framing, and more.

Moiré Gobo

A gobo that has two pieces of glass wherein one is fixed and the other rotates. Since the two pieces of glass are very close together, it creates an interesting interference effect (which is referred to as the "moiré").

Palette
Term for groups of groups; i.e. all the color groups would be considered the Color Palette, all the beam groups would be the Beam Palette, etc.

Pan
The movement of the luminaire around the axis of the yoke.

Parameter
An individual controllable aspect of a luminaire: pan, tilt, color, etc. Also known as "Attribute."

Patch
The act of assigning a DMX512 channel to a control channel on a console.

Reply
Digital data signals transmitted from each luminaire to the console. Only one luminaire may transmit at a time, in response to a request from the console.

Signal
Control protocol from a lighting console or interface.

Show File
A file containing all programmed cue data.

Shutter

See *Framing.*

Splitter (Isolator)
Device used to optically isolate and split a DMX512 signal. *Note: A DMX "two-fer" cannot be used to divide a signal.*

Start
To energize a luminaire arc lamp (applies to arc-lamp luminaires only).

Strobe
A special lighting effect which produces multiple rapid bursts of high intensity light.

Terminate/Termination
Termination refers to the dampening of DMX signal at the end of the transmission line. Termination is created by placing a 100 ohm resistor between pins 2 and 3 of the DMX line. Often, there is a switch on DMX devices to do this internally. If not, a terminator is provided in the form of an XLR connector with the proper resistor between pins 2 and 3 to be placed in the DMX Thru port on the device.

Tilt
The movement of the luminaire around the axis of the tilt tube.

Time
Control of the duration of the change of the variable parameters of some automated luminaires and other devices in a lighting system.

Timing Channel
A Timing Channel is used in lieu of cue fade rate to determine the time it will take a luminaire to move from one setting to another. For example, a cue in which a luminaire pans from one side of stage to the other may look "steppy" if cue fade rate is used, because of the nature of the DMX512 signal. To overcome this, a timing channel allows the luminaire to calculate the move "in time," effectively smoothing out the movement.

Zero Position
Pan and Tilt values at 50%. Also called "Home Position" or a "50/50" cue or group.

Zoom Table
Allows the fixture to maintain sharp focus on an image throughout the zoom range. (Note that zoom tables are sensitive to throw distance. For this reason, a variety of zoom table versions are available for use with different throws.)

8-Bit DMX

The universally accepted lighting control protocol in the entertainment industry. A console uses this protocol to control specific devices in a lighting system. A DMX512 channel packet is eight bits of absolute parameter data. 8-bit refers to the resolution of the signal: 256 step resolution, providing channel values from 0 through 255. A DMX512 data packet is a group of 512 data channels.

16-Bit DMX

To smooth out the movement of automated luminaires, the industry has adopted 16-bit DMX. This is not a change to the DMX512 specification, rather a change in the way luminaires and consoles treat DMX512 information. In practice, 16-bit DMX adds a DMX512 channel each to pan and tilt - pan coarse, pan fine, tilt coarse, tilt fine, instead of just pan and tilt. The console and luminaire combine these levels and increase the resolution of pan and tilt from 256 steps to a theoretical maximum 65,536 steps at the console level, resulting in the ability to position the luminaire more accurately.

Notes

Best Boy 4000® Spot Luminaire User Manual

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